No. 730,780. PATENTED JUNE 9, 1903.

O. U. MIRACLE & W. L. DOW.

BUILDING WALL AND CONCRETE BLOCK FOR SAME.

APPLICATION FILED DEC. 1, 1902.

NO MODEL.

Fig. 2.

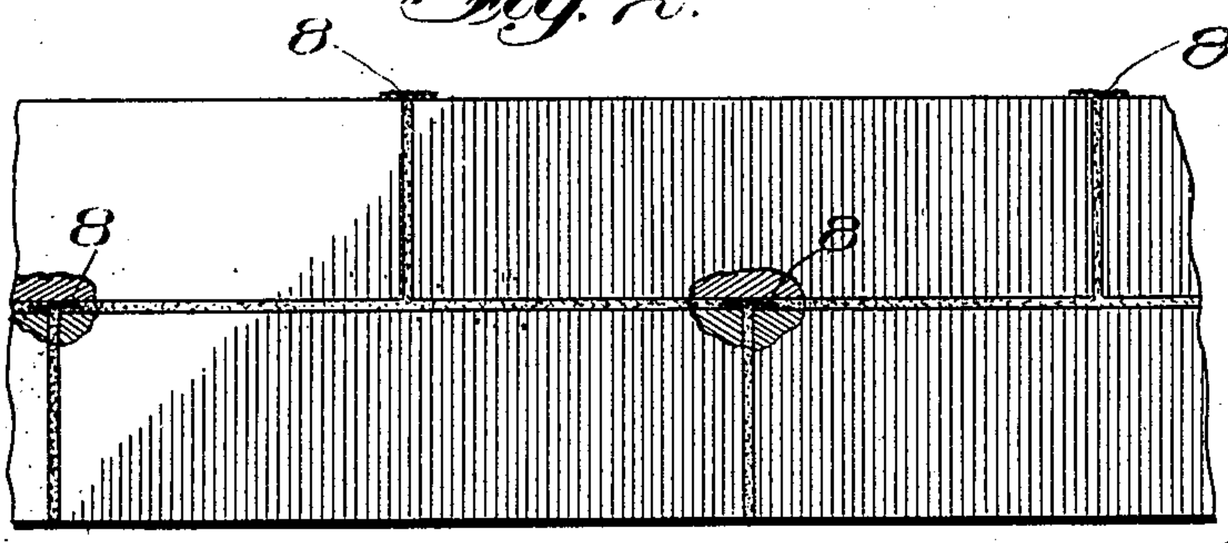


Fig. 4.

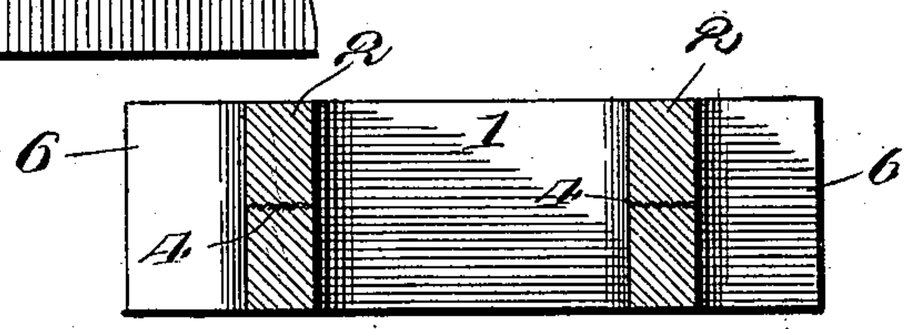


Fig. 3.

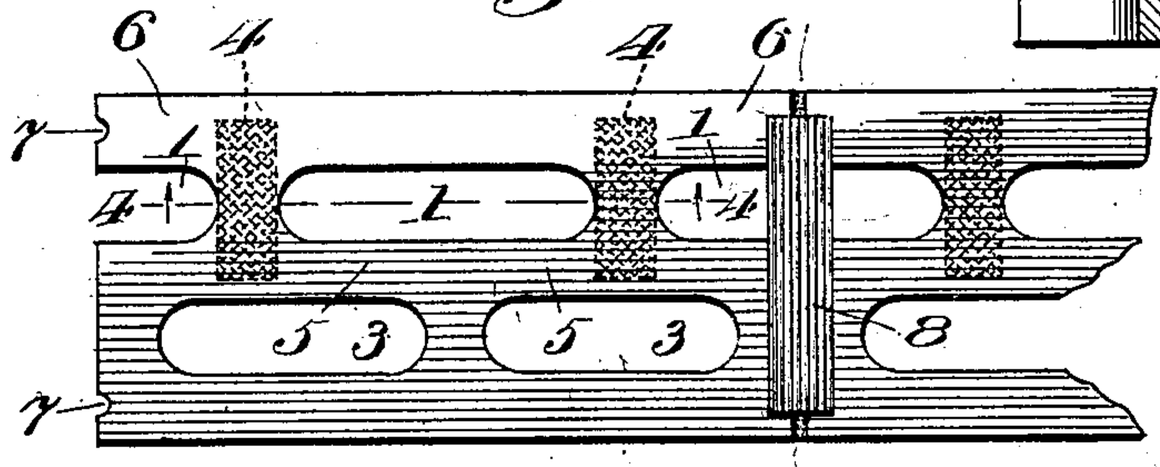
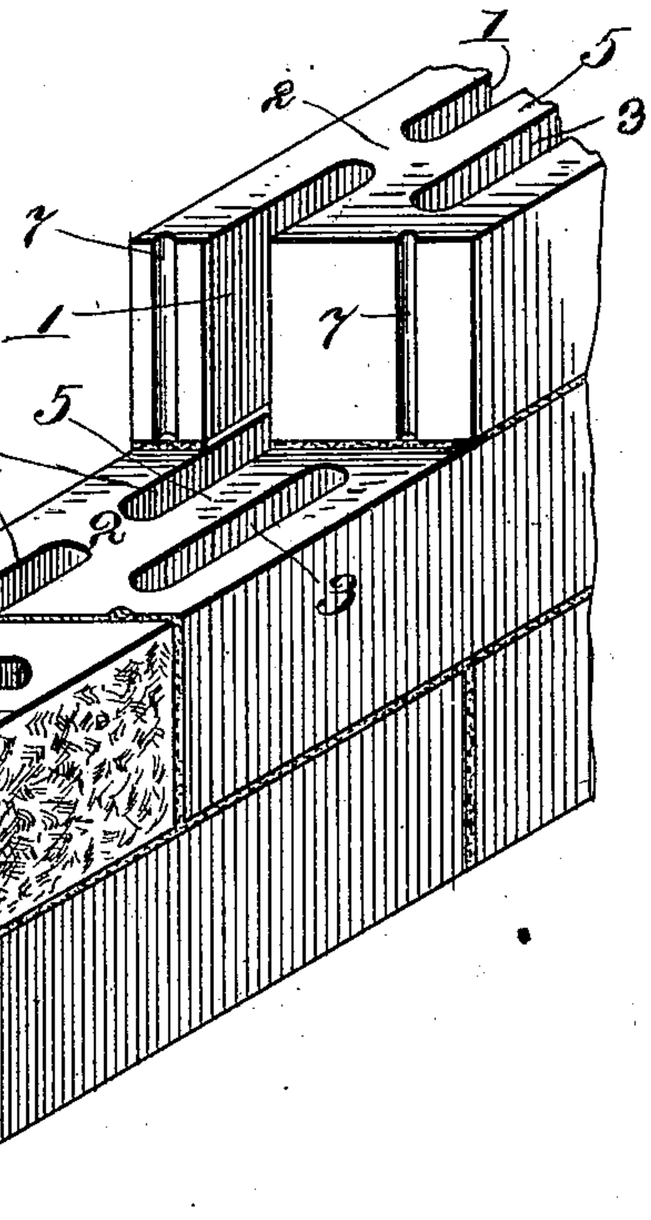


Fig. 1.



Witnesses.
H. S. Gaither
Fred G. Fischer

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No. 730,780. Patented June 9, 1903.

UNITED STATES PATENT OFFICE.

ORVILLE U. MIRACLE AND WALLACE L. DOW, OF SIOUX FALLS, SOUTH DAKOTA, ASSIGNORS OF ONE-THIRD TO RALPH O. MIRACLE, OF SIOUX FALLS, SOUTH DAKOTA.

BUILDING-WALL AND CONCRETE BLOCK FOR SAME.

SPECIFICATION forming part of Letters Patent No. 730,780, dated June 9, 1903.

Application filed December 1, 1902. Serial No. 133,386. (No model.)

To all whom it may concern:

Be it known that we, ORVILLE U. MIRACLE and WALLACE L. DOW, citizens of the United States, residing at Sioux Falls, in the county of Minnehaha and State of South Dakota, have invented new and useful Improvements in Building-Walls and Concrete Blocks for the Same, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved building-block of the general character of brick, tile, or stone concrete, which shall afford more complete protection against frost and have structural advantages not afforded by the concrete building-blocks heretofore made.

It consists in the features of construction which are specified in the claims.

In the drawings, Figure 1 is a perspective of a portion of a wall constructed of our improved concrete building-blocks. Fig. 2 is a detail elevation or face view of portion of such wall. Fig. 3 is a detail section at the line 3 3 on Fig. 1.

In the construction of our improved building-wall we employ the concrete building-blocks which are represented in the drawings and which will be first described in respect to their detail structure as individual or independent blocks.

Each block is formed with two longitudinal rows of apertures, oblong in horizontal section, extending vertically through the block, the apertures 1 1, &c., of one row located opposite the intervals or necks 2 2 of the other row. Preferably, also, but not necessarily for all purposes of the invention, one of the rows has at each end a half-length aperture, the blocks being designed to be assembled in the wall with these half-length apertures registering to form the full-length aperture. In order to strengthen the neck 2 between these half-length apertures and the next full-length aperture in the block, there are embedded in the concrete at these necks strips 4, of strengthening fabric, as woven-wire cloth. These strips preferably do not extend to the face of the block, but may without objection extend to the opposite aperture 3. The staggering arrangement of the air-spaces 1 and 3 of the two rows has the purpose and effect of preventing the existence of a continuous neck of concrete extending directly from the outer to the inner surface of the block. Such continuous neck is objectionable, because it affords, speaking in the common phrase, a short path for the frost from the outer to the inner surface. The staggering arrangement shown not only makes a long path comprising two of the necks 2 2, each of which ends at one end in one of the air-cavities, but in addition a length 5 of the web or diaphragm bounded on both sides by the air-spaces 1 and 3. The exposure of the web 5, as well as that of the ends of the neck 2 at the cavities 1 and 3, tends very greatly to prevent the formation of frost on the inner surface at the end of the neck 2 which terminates at that surface, because of the large area at which the material may gather heat from the adjacent air in the spaces 1 and 3, or, conceiving of cold as a positive instead of a negative, because of the large area for radiation in the said air-spaces. Preferably the blocks are assembled in the wall with the row of apertures 1 1, which includes the half-length apertures at the ends of the blocks, at the inner side. The advantage of this construction is that thereby the outer side, which is presumably more likely to be exposed to blows or shocks, is the stronger, having none of the half-length apertures which necessitate the short terminal tongues 6, which are more liable to be broken off than the full side wall or bridge extending the whole length of an aperture is to be broken in two, and for the same reason, preferably, as stated, both half-length apertures, which necessarily result from the staggered construction, are formed in one of the

rows instead of one in each row, because by this means all the half-length apertures, and thereby all the terminal tongues 6, may be at one side and are by the mode of assembling above indicated at the inner and less-exposed side.

By the construction above described it will be observed that a given amount of concrete formed into a building-block of a given width or cross-sectional area will yield a block of such character that when assembled one above another in the construction of a wall it is less liable to collapse, because the comparatively thin walls of the cavities are more frequently braced by the cross-webs; but, furthermore, an especial advantage from the structure shown is that damage resulting from breaking through the shell into any aperture is very much less than would result from similar breaking if there were but a single row, because whereas in the former case after one such break there is still a full aperture with walls on both sides unbroken intervening between the outer air and the space inclosed by the wall, in the latter case—that is, where the apertures are in a single row—a crack or break leading into any one aperture destroys the whole value of the air-space as a means of preventing the conduction of heat or the formation of frost, and there is left but a single thin wall between the inside and outside air. In view of these advantages of the form of block herein shown it is designed to construct them of suitable depth or thickness, so that they may be assembled in a single layer to form a wall, the wall being thus of the thickness of the individual blocks only. When thus assembled—that is, without another layer lapping the joints of the first, as would be the case in ordinary erection of brick structures—it is desirable to provide against lateral displacement, which is guarded against by the lapping structure, and for this purpose there are formed in the ends of the blocks vertical grooves 7 7, in which the mortar hardening operates as a key, preventing to the extent of its resistance to shearing the lateral displacement of the blocks.

Preferably the adjacent blocks in each tier are secured together in addition to the vertical securement effected by the mortar by means of longitudinally-corrugated metal binders 8 8, which are lodged in the mortar lapping the abutting ends of the two blocks at each joint, as seen in Fig. 2. The mortar hardening in the corrugations of these binders operates, as in the vertical grooves 7, to the extent of its resistance to shearing as a key, preventing the longitudinal separation of the blocks so far as that might occur by the parting of the mortar, it being presumed that the mortar will make a junction with the block stronger or less liable to be parted than the mortar itself is to be broken, so that the corrugated-metal binder embedded in the mortar as described tends to make the entire joint as strong as the junction between the mortar and the concrete block.

We claim—

1. A building-wall consisting of concrete blocks having a plurality of rows of vertical air-cavities, the cavities of one row being opposite and longer than the intervals between those of the other row, whereby they lap by the ends of the consecutive cavities of the other row, such blocks being assembled in the wall with their cavities registering one above the other in vertical succession to form continuous vertical cavities in the wall.

2. A building-wall consisting of concrete blocks having two rows of vertical air-cavities, the cavities of one row being located opposite and longer than the intervals or necks between the consecutive cavities of the other row, whereby they lap by said consecutive cavities, one of the rows having at each end of the block a half-cavity constituting a notch or recess in said end, the blocks being assembled in longitudinal order, with such half-cavities registered and forming together a complete cavity crossing the junction-plane.

3. A building-wall consisting of concrete blocks having two rows of air-cavities, the cavities of one row being located opposite and being longer than the intervals or necks between the consecutive cavities of the other row, whereby they lap by the ends of such consecutive cavities respectively, one row of cavities comprising a half-length cavity constituting a notch or recess at each end of the block, the blocks being assembled in the wall with the row having such half-length cavities at the inner side of the wall, and with such half-length cavities matched or registered to form full-length cavities.

4. In a building-wall, concrete blocks having two rows of cavities, the cavities of one row being opposite the intervals between those of the other row; said blocks having strengthening fabric embedded in the concrete extending across the necks or intervals between consecutive cavities to strengthen said neck.

5. In a building-wall, a concrete building-block having rows of air-cavities separated by intervening necks or webs of the concrete, abutting ends of the blocks having half-length cavities which register to form complete cavities when the blocks are assembled in the wall, said blocks having strengthening fabric embedded in the concrete at the necks or intervals between such half-length cavities and the next cavity thereto.

6. In a building-wall a concrete block having two longitudinal rows of air-cavities, such air-cavities extending vertically through the blocks, the cavities of each row being located opposite the intervals between those of the adjacent row, one of the rows having at both ends a half-length cavity; the block being formed with a strengthening fabric, such as

woven wire, embedded in the concrete at the neck between said half-length cavity and the next cavity in the same row.

7. A concrete building-block having a plurality of longitudinal rows of vertical air-cavities, the cavities of one row being opposite the intervals or necks between those of the other row, and being longer than such intervals or necks, whereby they lap by the ends of said consecutive cavities respectively.

In testimony whereof we have hereunto set our hands, each in the presence of two witnesses, at the places and on the dates herein below indicated.

ORVILLE U. MIRACLE.
WALLACE L. DOW.

Witnesses to signature of Orville U. Miracle, at Chicago, Illinois, November 25, 1902:
H. S. GAITHER,
CHAS. S. BURTON.

Witnesses to signature of W. L. Dow, at Sioux Falls, South Dakota, November 26, 1902:
J. H. SHELDON,
C. W. SMITH.