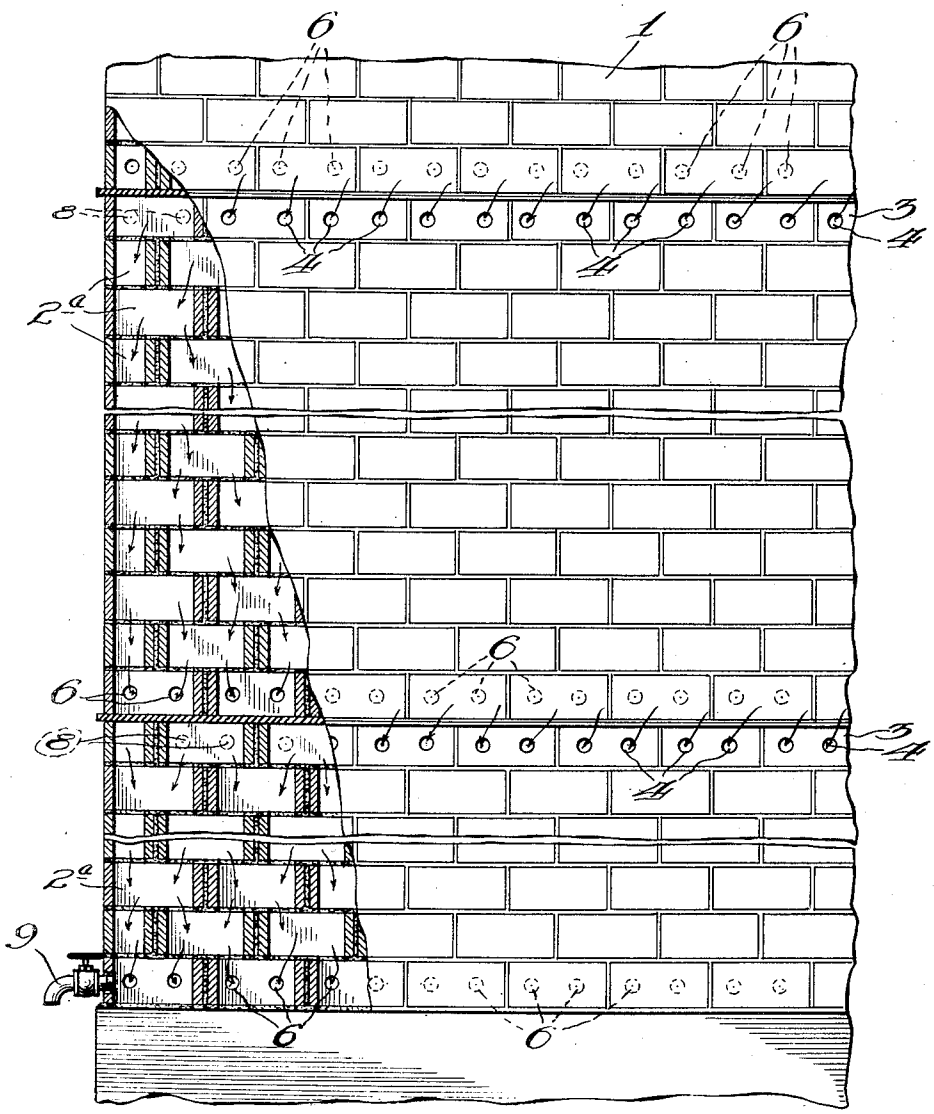
May 26, 1925. 1,539,611

E. E. TROWBRIDGE

AIR VENTILATED CONSTRUCTION AND BUILDING UNIT USED IN CONNECTION THEREWITH

Filed April 6, 1923 3 Sheets-Sheet 1

Fig. 1.



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AIR VENTILATED CONSTRUCTION AND BUILDING UNIT USED IN CONNECTION THEREWITH

Filed April 6, 1923. 3 Sheets-Sheet 2

Fig. 5.

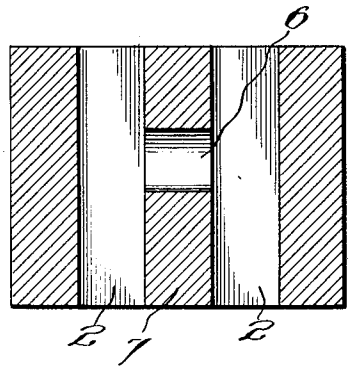


Fig. 6.

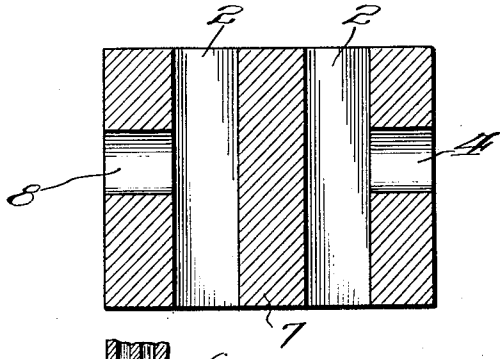
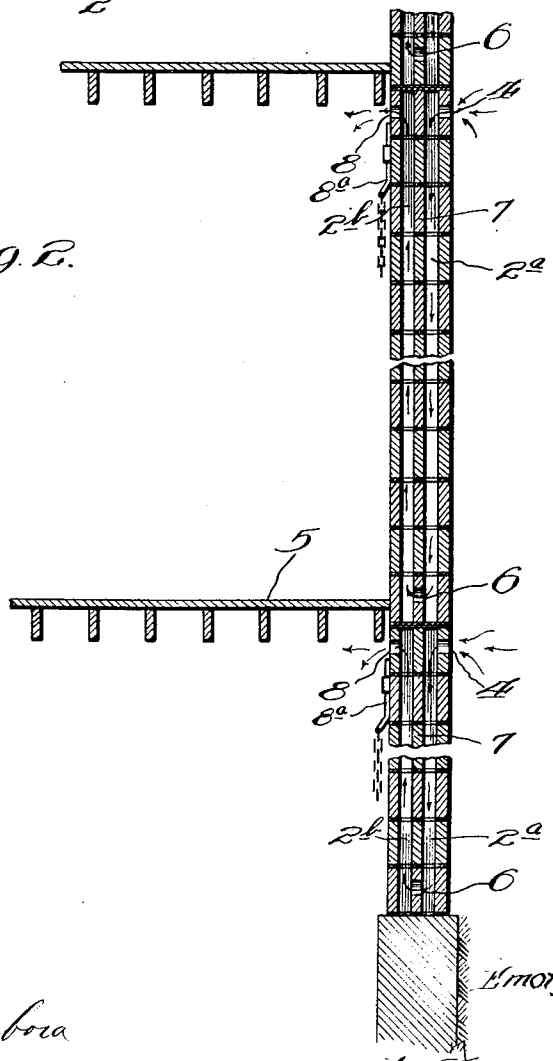


Fig. 2.



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Filed April 6, 1923 3 Sheets-Sheet 3

Fig. 3.

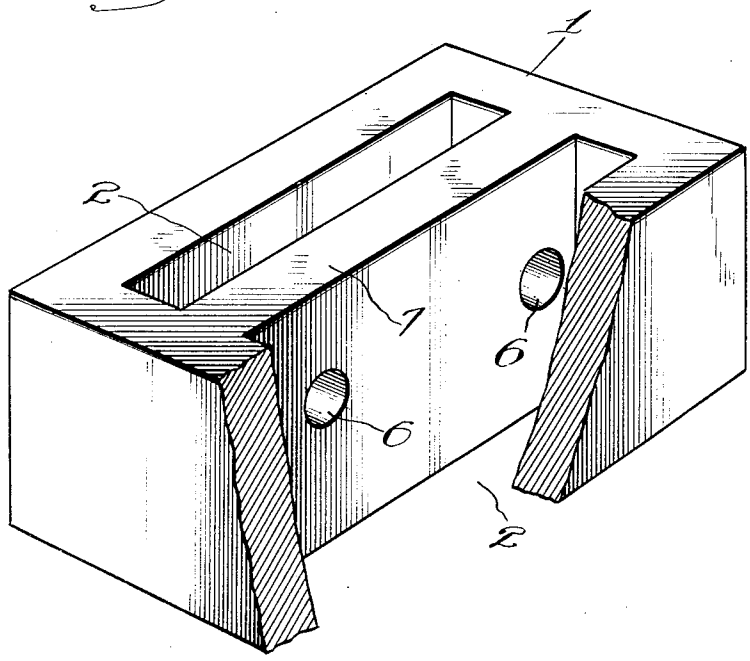
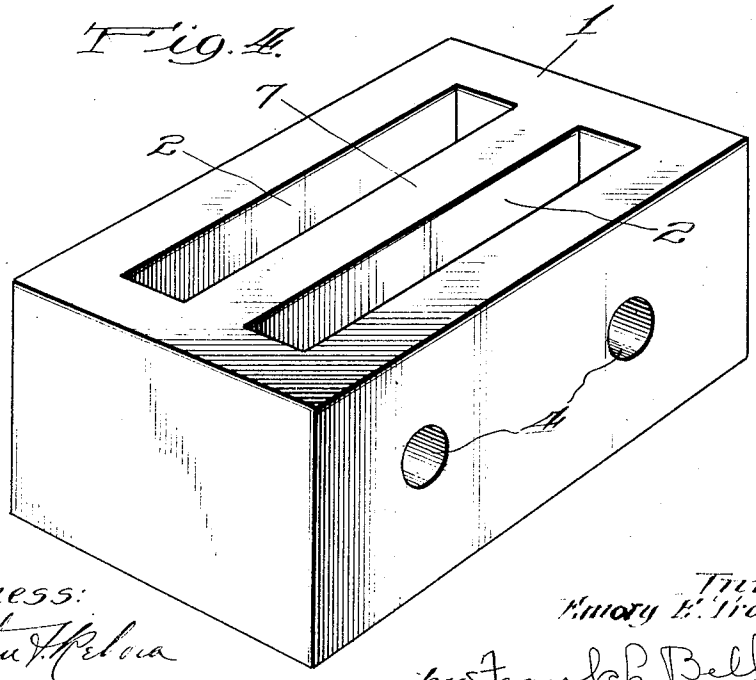


Fig. 4.



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Patented May 26, 1925. 1,539,611

UNITED STATES PATENT OFFICE.

EMORY E. TROWBRIDGE, OF KANSAS CITY, KANSAS.

AIR-VENTILATED CONSTRUCTION AND BUILDING UNIT USED IN CONNECTION THEREWITH.

Application filed April 6, 1923. Serial No. 630,190.

To all whom it may concern:

Be it known that I, EMORY E. TROWBRIDGE, a citizen of the United States, residing in the city of Kansas City, county of Wyandotte and State of Kansas, have invented new and useful Improvements in Air-Ventilated Constructions and Building Units Used in Connection Therewith, of which the following is a specification.

This invention relates to improvements in ventilated building constructions and refers more particularly to a construction in which air is circulated through chambers in the building units or building blocks, producing a construction which obviates a dead air space in the walls of the building, preventing moist conditions therein.

Among the salient objects of the invention are to provide a construction in which provision is made for the circulation of air from the atmosphere to the interior of the building through the building wall, by continuous ducts or channels, to provide a construction in which the continuous circulation prevents the collection of moisture in the walls of the building and provides a construction which is warmer in winter and cooler in summer, due to the constant open circulation maintained therein.

The freely communicating air chambers also provide space into which water may be flooded in case of fire.

Fig. 1 is a side view of a portion of one of the walls of a building with parts in section.

Fig. 2 is a sectional view taken through the walls shown in Fig. 1.

Fig. 3 is a perspective view of one of the building blocks with parts broken away to show one of the air chambers and communicating vents.

Fig. 4 is a perspective view of one of the building units used in the upper or lower rows having the vents or passages through the exterior wall of the building block.

Fig. 5 is a sectional view taken through a block such as that shown in Fig. 3; and Fig. 6 is a sectional view taken through a block such as that shown in Fig. 4 with passages or vents through both the exterior and interior walls.

Referring to the drawings, the walls of a building are constructed of the building units in the manner shown in Fig. 1, that is, the blocks 1, are so laid that the annular air chambers or passages 2 which run in a vertical direction through the body of the building units, communicate to form continuous passages. Near the ceiling of each floor is laid a tier or row of blocks such as that shown in Fig. 4 and designated as 3 in Fig. 1. These blocks have vents or passages 4 in their exterior walls, which permit the ingress of air to the outer air chambers of the blocks. The air will then pass downwardly through the communicating air chambers of the rows of building tile or building blocks through continuous ducts shown more clearly at 2^a in Fig. 2.

The air passing downwardly in the direction of the arrows proceeds to a lower tier or a row of building blocks laid adjacent at floor 5. The blocks in this tier are similar to those shown in Fig. 5 with the communicating vents 6 or passages between the twin air chambers in the partition walls 7.

The air passes thence from the outer air chambers through these ducts to the inner air chambers designated in Fig. 2 as 2^b. In a like manner, the air chambers of the separate rows communicate to form continuous passages whereby the air passing downwardly from the outer chamber will rise through the passages formed by the inner chambers. The air rising through these inner passages will flow into the interior of the building through the vents 8 in the interior walls of the building blocks shown in Fig. 2 and Fig. 6. That is, this upper tier or row of blocks laid near the ceilings of the separate floors will be of a character shown in Fig. 6 with air ducts or passages in the inner and outer walls of the blocks with a solid partition between the adjacent air chambers. In the same manner, the building blocks which make up the basement or upper floors of the building, will be laid to permit the ingress of air through the passages or apertures in the outer walls of the blocks, whereby the air will be directed downwardly through the outer air chambers through vents or passages in the low tier or row and

upwardly through the inner chambers, finally passing into the building through controlled ventilation not shown positioned in front of the ports or passages 8.

It is a well known fact that during the winter seasons, the air or barometric pressure is high over the continent and low over the ocean and this is reversed during the summer months. In a like manner, it is true that the inside of a building, constructed of ventilated building blocks, such as those explained, will be warmer in winter and cooler in summer, for the obvious reason that during the cold weather, the twin air-vent chambers will be a double protection from the outside cold. Air confined in a compartment, that is to say, dead air, absorbs heat. Live air, the air in circulation, radiates heat. Cold air becomes dense and descends, while warm air expands and rises. Thus it is seen, that in cold weather, the cool air will be found descending through the outer vent chamber and as it warms, it will ascend through the inner air-vent chamber until it empties or finds egress into the space between the ceiling and the roof of the building or as shown in the drawings near the ceiling of each floor.

In its progress it has come in contact with the warmer inside walls and continuing to rise, will radiate the warmth it has absorbed.

The reverse will be true in the summer time, that is, the outer walls being heated from the rays of the sun, will naturally warm the air in the outer air-vent passages, causing it to expand and rise. The cool air will remain in the inner air-vent chamber adding to the coolness of the interior of the building by a constant circulation of live air through the air-vent system.

The way in which a building is divided or partitioned into rooms, will govern to a great extent, the manner in which the building blocks are laid, in order that the most satisfactory circulation of air to the separate divisions of the building, will be affected. If the building has but a single room with no excavated portion, the building blocks may be laid to provide for a single circulating system, that is, the air from the outside may be circulated throughout the length of the entire wall and thence into the interior of the building. In larger constructions, however, where the interior of the building is unevenly heated, it is more desirable to have separate circulating systems for the separate floors at least.

At 9 in Fig. 1 is shown a valve draw off, which is used in case it is desired to flood the wall in the event of fire.

Another important advantage of this construction, is the increased safety afforded in case of severe storms, where there is a rapid decrease in the barometric pressure. Heretofore, the equation of the elasticity of air pressure has been ignored in the construction of buildings, because of this elastic pressure of unit volume of air will expand in all directions, if not confined in a rigid enclosure. The air pressure is influenced by the amount of molecular energy present in the form of sensible heat and latent heat. The molecular energy, known as latent heat, does the internal work, such as melting ice or boiling water, while the sensible heat does work such as expanding and pushing in all directions. These molecular energies can be transformed into each other over and over again without appreciable loss.

When a storm center passes through a certain locality, the air pressure in the path of the storm is very low and there is an effort and readjustment by a rush of air into the low area, for the reason molecular energy, which is constantly expanding and pushing in all directions will cause the air to flow in that direction which offers the least resistance. When the air pressure on the outside of a building is suddenly lowered, the equilibrium is lost and the air, which is confined in rigid compartments of the structure, will free itself by an explosion, which will wreck the building in many instances. Every hollow tile wall, which does not provide for the circulation of air, is honeycombed with compartments with energy hermetically sealed.

In the ventilated construction described, these objections have been overcome, by providing means for permitting a rapid readjustment of atmospheric conditions between the inside and outside of a building. The maintenance of a constant live circulation of air will thus maintain the equilibrium without harm to the structure, in spite of rapid changes in barometric pressure.

The building blocks or tiles, with vertical hollow communicating air chambers so arranged and separated by a middle partition or wall, that they provide communicating double air circulating passages, will permit a free circulation of live air with no stagnant air pockets in any portion of the construction.

Ventilated openings may be installed in each room in the building, which will provide for change of air through the air-vent system. At 8^a in the drawings is shown a controlling means for regulating the amount of air which is permitted to enter the building through the ventilating system.

I claim as my invention:

1. In building wall construction, the combination with a plurality of hollow building units having interior partitions arranged in tiers to form continuous communicating air passages, ports in the exterior walls and interior partitions of selected units and between the passages whereby the air will pass continuously from one side of the wall down

one passage and in an opposed or upward direction through the other passage, and out from the other side of the wall.

2. In building wall construction, the combination with a plurality of hollow building units having interior partitions arranged in tiers to form continuous parallel air passages, ports in the exterior walls and interior partitions of selected units and between the passages whereby the air will pass in an opposed direction in the adjacent parallel passages, forming a continuous circuitous travel through the wall.

EMORY E. TROWBRIDGE.