A. KNAPEN.

DRYING BUILDING STRUCTURES AND MATERIALS THEREFOR.

APPLICATION FILED JAN. 25, 1913.

1,095,734.

Patented May 5, 1914.

2 SHEETS—SHEET 1.

Fig. 1.

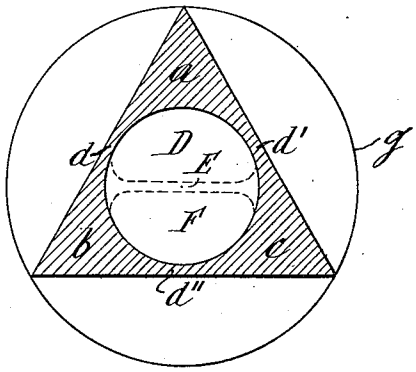


Fig. 2.

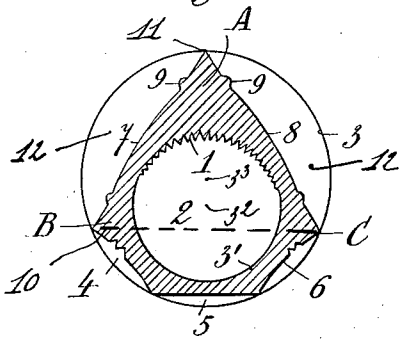
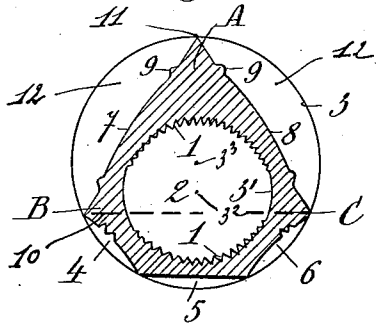


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

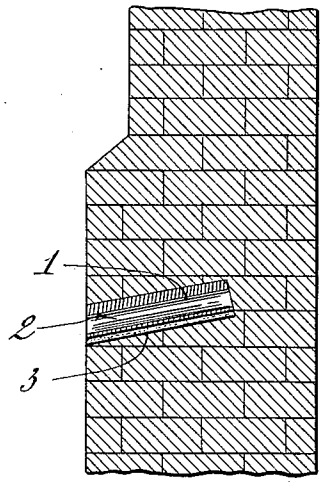
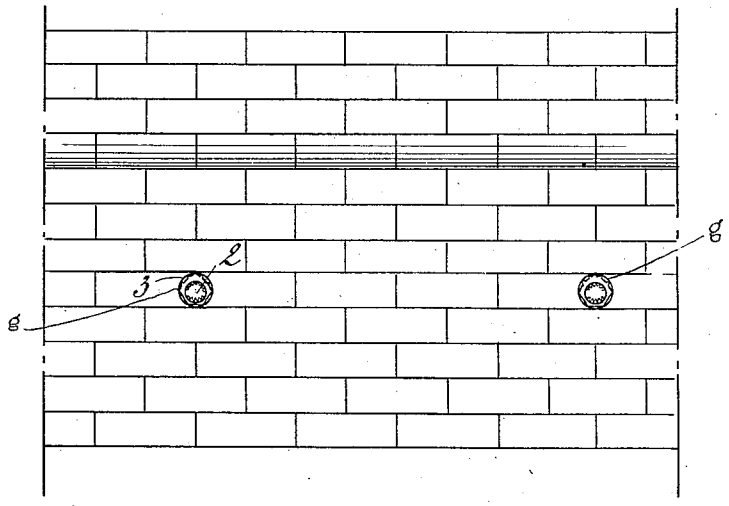


Fig. 5.



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DRYING BUILDING STRUCTURES AND MATERIALS THEREFOR.

1,095,734. Specification of Letters Patent. Patented May 5, 1914.

Application filed January 25, 1913. Serial No. 744,221.

To all whom it may concern:

Be it known that I, ACHILLE KNAPEN, a subject of the King of Belgium, residing at Brussels, in the Kingdom of Belgium, have invented certain new and useful Improvements in or Relating to the Drying of Building Structures and Materials Therefor, of which the following is a specification.

My invention relates to improvements in or relating to the drying of building structures and materials therefor and more particularly to stones provided with an air circulation conduit such as described and illustrated in my former Patents Nos. 915969 granted March 23, 1909 and 931318 granted Aug. 17, 1909.

One object of my invention is to reduce the dimensions of the molded stone as much as possible as indeed the practice has shown that as hitherto constructed the molded stones affect, in some cases, the stability of the walls and the cohesion of the material in which they are to be inserted for the reason that, in order to insert the stone into the wall, a hole of sufficient diameter must to receive the molded stone be made in the latter.

A further object of my invention is to increase the action of drying so as to secure a drying of the wall in a comparatively very short time and in such a manner that the reduction of the dimensions of the molded stone does not interfere with its drying action.

With these objects in view my invention essentially consists in the several features, arrangements and combinations of parts as will be hereinafter fully described and pointed out in the appended claims.

Referring to the annexed drawings: Figure 1 is a cross-section of a drying stone as hitherto constructed. Fig. 2 is a cross-section of a similar stone constructed according to my invention. Fig. 3 is a cross-section of a further embodiment of my invention. Fig. 4 is a cross section through a wall provided with a stone or brick embodying the features of my invention; Fig. 5 is a front elevation of the wall showing the stones or bricks arranged at suitable intervals therein.

The stone shown in Fig. 1, which is of usual construction is provided with an air circulation conduit D amounting to at least 26–36 mm. in order to insure a regular process of circulation adapted to secure the drying of a wall in which said stone is inserted the drying being accomplished as set forth in my former Patent 915,969. Hitherto the stones intended for drying walls have been usually made of the triangular cross-section shown in Fig. 1. With a minimum thickness of walls of 2 mm., as the limit set by the porous material and with a conduit D of a diameter equal to 30 mm., the stone measures in the direction of width 65–75 mm. or in other words, the circle circumscribed around the cross-section of the stone has a diameter of 65–75 mm. so that in order to insert the stone into the wall, a hole g of the same diameter must be made in the latter see Figs. 4 and 5. The chief thickness of the wall of the conduit D is situated at the places a b c and the center of the conduit D is coincident with the center of the circle g circumscribed around the cross-section of the stone. These portions a b and c of the wall which consist of proportions equal to each other, are connected together by narrow wall portions d, d', d''. The current of fresh air entering the conduit, in coming in, always remains in contact with the upper portion a, when it is warmer and drier outside the wall than inside the same. The air is then saturated with vapors of water, is thus cooled, passes at the inner end of the conduit downward, flows along the bottom portion of the conduit outward and carrying the vapors of water, escapes through the bottom portion of the outer opening as has been disclosed in my former Patent 915,969. In the air outside the wall is colder than inside, the process is reversed. On the one hand the stability of the walls and the cohesion of the material, as already stated, and on the other hand aesthetic considerations make it necessary to reduce the dimensions of the molded stone as much as possible so that as small a hole as possible and yet sufficient to give the requisite drying action may be bored in the walls or other structure.

With this object in view, my improved molded stone, made of a body of suitable porous material is constructed as shown in Figs. 2 and 3. The hygroscopic material is arranged in the following manner: The largest part A is provided in the upper part, while two smaller parts B and C are arranged somewhat below the horizontal plane passing through the horizontal diameter of the conduit 2. This shape is obtained by

drawing into a circle 3 a regular octagon, the sides 4, 5 and 6 of which are shown in full lines. A second circle 3′, the center 3^2 of which is below the center 3^3 of the circle 3, represents the conduit 2 of the stone. The cross-section of the stone is limited, on the one hand, by the sides 4, 5 and 6, and on the other hand by two equal sides 7 and 8 which, with the line 10 connecting the outermost points of the sides 4 and 6, represent practically an isosceles triangle. The point of intersection 11 of the sides 7 and 8 is situated in the circle 3 which represents the hole *g* (Fig. 1) provided in the wall for receiving the stone. The upper portions of the wall of the stone are preferably provided with projections or teeth 9 in order to facilitate the connection of the stone with the wall. The intermediate spaces 12 between the wall of the wall hole 3 and the surface of the stone, are filled with mortar of suitable porosity and the lateral and upper portions of the wall are preferably curved or bulged out, in order to make them better able to resist the pressure of the wall. The upper surface of the conduit 2 of the stone is provided with longitudinal ribs 1 or the like and the size of said ribs decreases from the top to both sides. In some cases, that is to say in special temperature conditions, it may be advantageous to arrange similar ribs 1 also in the bottom portion of the conduit as shown for instance in Fig. 3. In said case the size of said ribs decreases from the bottom to both sides. The molded stones thus constructed are inserted into the wall in a distribution corresponding to the conditions, the conduits being arranged preferably at suitable intervals as shown in Fig. 5 so as to rise from the outside inward, left open at the outside and blind at the inside (see Fig. 4) as is now well known in the art of drying walls.

The molded stone made in accordance with the construction illustrated, gives a favorable result in every respect and produces a drying of the wall in a comparatively short time. The space occupied by the stone is considerably reduced and yet a maximum drying capacity is maintained. The said results may be explained as follows: Experience has shown that, in fact, the formation of the parts *a*—*b*— and *c* equal in size in the construction as hitherto used (Fig. 1) interferes with the drying action of the stone as indeed the parts *b* and *c* exercise an injurious influence on the direction and shape of the air current formed in the conduit (Fig. 1). If the parts *b* and *c* were not to exercise any influence on the neutral layer E formed as a kind of diaphragm between the two incoming and out-going currents D and F (Fig. 1) the same would remain at rest in the horizontal plane going approximately through the axis of the conduit. Experience shows however that this is not the case, owing to the injurious influence of the parts *b* and *c* on the layer in question. Said injurious influence is avoided in the present construction as indeed the amount of hygroscopic material A, B and C (Figs. 2 and 3) is proportioned in functional dependence on its position in such a manner that the condensation and the accumulation of the moisture is obtained by capillary action in the most favorable portion the fresh air entering into the conduit being saturated as quickly as possible with vapors of water when coming in contact with the surface of the conduit situated under the largest mass A. The said result is further improved by the increased evaporating surface secured by the ribs 1 in the upper portion of the conduit, or, as the case may be in the bottom portion or even in both portions of the conduit, without exceeding the diameter of 30–32 mm. for the conduit. Owing to said ribs the surface of the said portion is increased to such an extent that in the said portion the saturation of the air with vapors of water takes place much more quickly, all other conditions being equal. Consequently, owing to the arrangement of the said ribs, the dimensions of the conduit can be reduced while maintaining the desired speed of drying. Further, owing to the distribution of the material forming the wall of the stone, according to which a minimum of material forms the lowest portion, a larger portion forms the part substantially, in the plane of the horizontal diameter of the conduit and a still larger portion forms the upper portion of the stone, the evaporation is still accelerated and favorable comparatively strong differences of temperature are produced by the action of the edges in the upper portion of the conduit while the lateral-masses avoid an excessive lateral spreading of the neutral layer in the conduit, thus reduce the dead space and produce a uniform flow at the lateral surfaces.

The invention is obviously not restricted to the details of the construction shown; so, for instance, instead of limiting the bottom portion of the stone by a portion of an octagon, it can be also formed in an arc of a circle, but consideration must always be paid to maintaining the portions B and C.

Having thus described my invention what I claim is:

1. A molded stone for drying walls and the like, having a circulation conduit the center of which is displaced relatively to the center of the circle circumscribed around the cross-section of the stone.

2. A molded stone for drying walls and the like, comprising a body of porous material of irregular shape in cross-section, adapted to be circumscribed by a circle and

a circulation conduit formed in said body, the center of said circulation conduit being displaced relatively to the center of the circle circumscribed around the body of porous material.

3. A molded stone for drying walls and the like comprising a body of porous material limited laterally by two converging sides and having at its lower part a different shaped periphery, said body being adapted to be circumscribed by a circle and a circulation conduit formed in said body, the center of said circulation conduit being located under the center of the circle circumscribed around the body of porous material.

4. In a molded stone for drying walls and the like, a circulation conduit formed in said stone, two masses of hygroscopic material located substantially in the plane of the horizontal diameter of the conduit, a lower part of hygroscopic material connecting said masses and forming the lower part of the circulation conduit and an upper mass of hygroscopic material, greater than the sum of the lateral masses, said upper mass being connected with the lateral masses by thin portions of hygroscopic material.

5. In a molded stone for drying walls and the like, a body of porous material, a circular conduit formed in said body of porous material and ribs formed in said conduit, whereby the dimensions of the conduit can be reduced while increasing the drying action of the stone.

6. In a molded stone for drying walls and the like, a body of porous material adapted to be circumscribed by a circle, a circular conduit formed in said body of porous material, and longitudinal ribs extending in said conduit, the size of said ribs decreasing to both sides of the conduit.

7. In a molded stone for drying walls and the like, a body of porous material adapted to be circumscribed by a circle, a circular conduit formed in said body of porous material and having its center lower than the center of the circle circumscribed around the body of porous material, and longitudinal ribs extending in said conduit.

8. In a molded stone for drying walls and the like, a body of porous material, a circular conduit formed eccentrically in said body of porous material, longitudinal ribs extending in said conduit, two hygroscopic masses formed substantially at the ends of the diameter of the circular conduit, an upper hygroscopic mass, said mass being greater than the sum of the two lateral masses, means for facilitating the connection of the stone with a wall in which it is to be inserted and means for resisting the pressure of said wall.

In testimony whereof I have affixed my signature in presence of two witnesses.

ACHILLE KNAPEN.

Witnesses:
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JACQUES BEDE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."