April 22, 1941. G. E. SWENSON 2,239,127

WALL STRUCTURE

Filed July 25, 1938

Fig. 1.

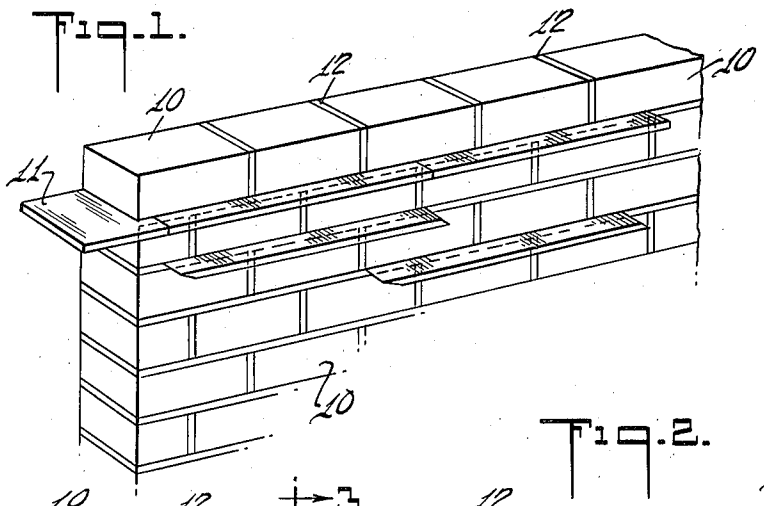


Fig. 2.

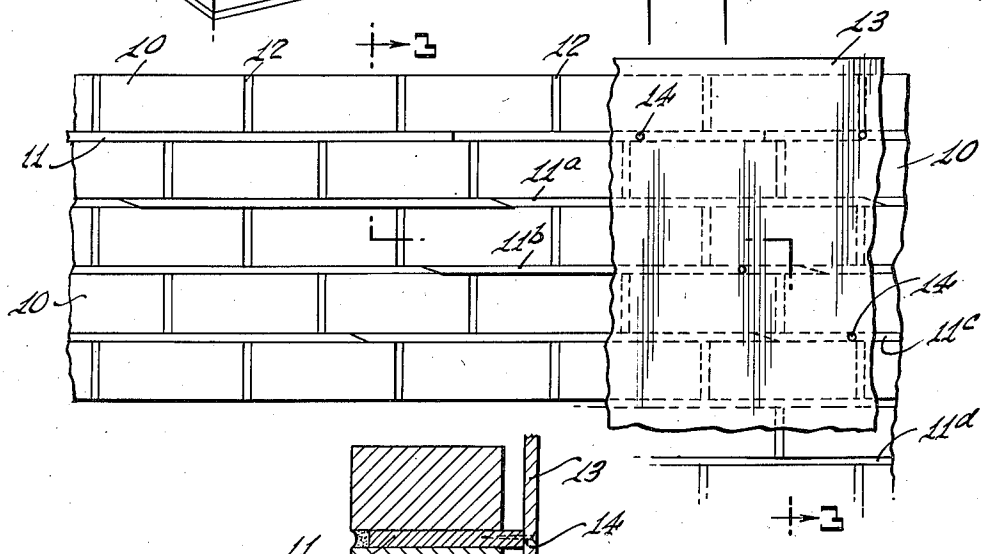
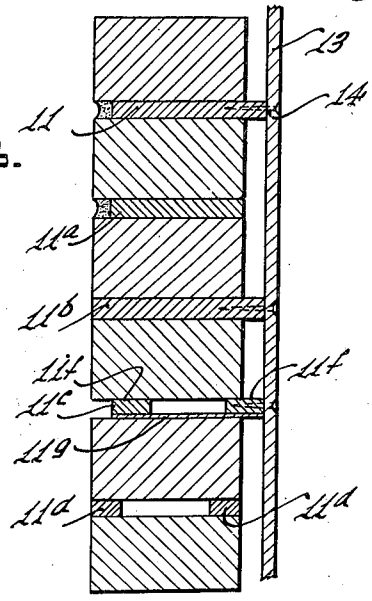


Fig. 3.



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WALL STRUCTURE

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In the ordinary construction of brick or masonry walls erected with mortar in the joints between the bricks or other wall elements as the binder, there are many disadvantages in that on the one hand the erection of a wall with mortar is a messy operation and on the other hand, since all of the elements of such a wall are hard and are neither receiving or nail-holding, it is difficult to attach other structural materials to such walls when they are completed.

According to the invention hereof, there are provided various features of wall construction which afford many advantages over previous methods of walls constructed in accordance with present practices. Walls erected in accordance with the methods of construction hereinafter more particularly pointed out have distinct advantages both during and after construction in that such walls are erected without the use of mortar, the erection of such walls is very rapid, the walls when erected are more water-proof than walls in which mortar is used in the joints and particularly by the methods of erection hereof walls erected in accordance with the invention hereinafter disclosed provide structures to which other structural elements may be readily and very simply secured.

Briefly, the methods of wall construction comprising the invention hereof involve the use of relatively thick sheet form fiber products having limited resilience, sheets of which are laid between superposed courses of the masonry units, in lieu of the mortar which has been previously used, and the weight of the wall elements is availed of to create the frictional effect which retains the wall structure firmly in assembled relation. Due to the fact that a nail receiving and holding material is used in the joints between the various courses of the structural elements of the wall there are afforded at every joint nail receiving members to which there may be secured other structural elements, secured either by nailing, or by screws, or by other suitable securing means.

The primary object of this invention is to provide a dry masonry wall construction, that is, one wherein it is not necessary that mortar shall be used. A further object of the invention hereof is the provision of a masonry wall construction wherein the finished wall is of such construction that other structural elements may be readily secured thereto and still further, it is an object of the invention to provide an improved form of joint material for the construction of a dry masonry wall as described. Other and further objects will be apparent from a consideration of the following detailed description concerning the invention.

In the accompanying drawing,

Figure 1 is a perspective view of a portion of a wall constructed in accordance with the invention hereof.

Figure 2 is a rear or interior face elevation of a portion of a wall incorporating the invention hereof; and

Figure 3 is a section taken on Figure 2, on line 3—3 looking in the direction of the arrows.

In the drawing in the various figures like portions thereof will be designated by like reference characters.

In constructing a wall in accordance with the invention thereof, there is used in lieu of mortar in the joints between the elements making up the wall, a joint material which preferably is provided in sheet form prepared in advance of the actual construction of the wall.

The preferred joint material has as its base, sheet form products which are generally referred to as fiber insulating board being composed of felted cellulose fibers which are formed and felted from a water suspension of the fibers in accordance with the general practice of paper making. The sheets of fiber board from which the joint strips are made will be preferably approximately ½ inch in thickness and for the purposes hereof, the such sheets are saturated to the extent of about 150%, but which saturation may range from around 120% to 200%, of the weight of the fiber sheet.

To one skilled in the art to which this invention relates it will be apparent that since the base material herein used, that is, the fiber insulating board, will ordinarily absorb asphalt to the extent of about three times the weight of the fiber board, that is, 300% saturation, therefore, the preferred saturation of the fiber board joint material hereof to the extent of 150%, or to between the stated limits of 100% and 200%, constitutes by no means a complete saturation of the fiber board material. Also it will be apparent that since the interstitial spaces and voids of the fiber board sheet are only partially filled with asphalt by saturation to the extent stated, therefore, the so saturated sheet may within reasonable limits be compressed by the application of pressure to its faces or by the application of internal pressure caused, for example, by the driving of a nail into the saturated sheet without flow of the displaced material to some other position, that is, the material of the

sheet remains compressible and upon the application of compressive force there occurs compression rather than a displacement and flow of the material.

As a saturant for the fiber sheet in preparing it for use as a joint strip in wall construction in accordance with my invention, there is preferably employed a bituminous saturant which may conveniently be a Venezuelan residual asphalt of around 120 degrees F. melting point but which saturant may range from one of about 100 degrees F. melting point, to one of up to say 180 degrees F. melting point. In lieu of the particular saturant mentioned there may be of course used other bituminous saturants which have substantially the physical properties of the saturant particularly mentioned or there may be used suitable pitch or resins or the like which have comparable physical properties.

The sheets after saturation as described may thereafter be coated with the same material as is used for saturation or with other compatible substances such as was above mentioned in connection with the description of the saturation of the sheet.

It is to be noted that the surface coating, if the sheets are coated, should be a rather thin surface coating only, since if it is of excessive thickness there may be a tendency for such coating to flow under pressure and be squeezed out of the joint spaces or under some circumstances, an excessive thickness of coating on the strips may bring about or allow slippage of the masonry units which of course would be undesirable. It is suggested that a surface coating on the strips should not be of greater thickness than 1/64 inch in thickness, that is, just about sufficient coating to afford a coating as thin as can possibly be applied to afford a complete coating of the surfaces of the sheet.

The sheets from which the joint strips are cut, having been treated in accordance with the foregoing, may be cut to convenient widths and lengths for use in connection with the construction of masonry walls and in connection therewith the strips may be cut to approximately the thickness of the wall in which they are to be utilized and to convenient lengths, say a length of about four feet.

In cutting the joint strips, it is preferable that the ends of the strips be scarfed as appears in the accompanying drawings in order that where adjacent strips adjoin the scarfed ends may be overlapped to provide a tight joint through the structure at such overlap. The strips when formed may of course be cut with square ends, that is not scarfed, in which case care should be taken to see that the strips are closely abutted when they are laid in the wall structure. If desired, of course the ends of the strips may be cut in a ship-lap form or provided with a tongue or groove or other suitable joint so that the ends of the strips may be brought into close and overlapping arrangement.

In constructing a wall in accordance with the invention hereof, there may be used as the masonry elements, bricks, concrete blocks, cinder blocks, stone blocks or substantially any other desired materials comprising those ordinarily referred to as masonry units and in the drawing the units indicated by the numeral **10** may be any suitable structural block or units as above mentioned. It is of course to be understood that the structural units **10** may be more or less of a hollow nature as is particularly common in the various cement blocks available and that further the ends of the blocks may be formed of a more or less interlocking or overlapping configuration as is a relatively common form in which various cement, terra cotta and other structural units are available.

In laying up a wall in accordance with the invention hereof, there will of course be provided some suitable foundation wall or the like to support the masonry wall and while the such foundation wall is not illustrated in the drawing, it will be understood that such or its equivalent will be provided. On a suitable foundation structure there will be laid a layer of the joint strips comprising a portion of the invention hereof which joint strips in the drawing are indicated by the numerals **11**, but which in various modifications thereof are further indicated and differentiated by the use of letters associated with the numerals **11**.

Whereas in the drawing and as particularly shown in Figure 3 thereof, various modifications of the joint strips are illustrated in connection with the various courses of the construction it is to be understood that such showing is merely illustrative for the purposes hereof and that in practice it is improbable, that the various modifications of the joint strips will be incorporated in a single wall construction, although, if desired in order to obtain particular results there is no reason why the various modifications of the joint strips cannot be incorporated in a single wall construction.

After a layer of joint strips **11** or of one of the modified forms thereof have been laid on the foundation supporting the wall there will then be laid upon such joint strips a layer of the masonry units **10**, which units if of square end construction as are particularly illustrated in the drawing will preferably have inserted between the adjacent ends thereof suitable strips of joint material **11**, such strips being specifically indicated by the numeral **12** in Figure 1 to differentiate from the horizontal strips which are indicated by numeral **11**.

After one layer or course of the masonry units have been incorporated into the wall structure as has been described then a further layer of the joint strips **11** is laid on the upper surface thereof and a further layer or course of the masonry units **10** is laid thereon and the construction of the wall can then proceed by a repetition of such alternate laying of joint strips **11** and masonry units **10**. It will of course be understood that a course need not necessarily be laid entirely across the wall before another course is started thereon, although it is of course preferable that the masonry units of a course be applied in sufficient number so that such joint strip material **11** as is laid thereon will not overhang but will be supported upon the masonry course for its full length.

In the drawing, in Figure 3, there are indicated various modifications of the joint strip material which may be utilized for particular purposes or to obtain particular results and in connection therewith it will be noted that the joint strip **11** is of such width and so applied in the wall structure that when set in, inwardly from one surface of the wall, it will project out slightly from the other surface of the wall. The joint strip indicated at **11** is slightly narrower than the width of the wall and is illustrated as applied when one edge positioned inwardly from

one face of the wall and with its other edge flush with the other face of the wall. The joint strip 11b is of a greater width than the thickness of the wall so that when one edge of the strip is flush with a face of the wall the other edge of the strip will project somewhat past the other face of the wall. Joint strip 11c is a fabricated joint strip which as illustrated is over all of a width approximately the thickness of the wall. Joint strip 11c comprises two relatively narrow strips of the joint forming material which narrow strips are particularly indicated at 11f, which narrow strips 11f are mounted in spaced relation on a suitable fabric or the like 11g. The composite joint strip 11c formed of two relatively narrow strips 11f of the joint strip material economizes in the use of the joint strip material and substitutes for a portion of the joint strip material a relatively thin sheet 11g of a suitable fabric or the like which strip 11g may be actually a fabric or a sheet of tough paper or of felted fiber or the like and which strip 11g may conveniently be formed from an ordinary saturated roof felt. The strips 11f of the joint material will of course be suitably secured to the fabric strip 11g by a suitable adhesive or by stapling or the like.

The joint strips indicated at 11d are two separate strips of the joint strip material which are when placed in the wall structure properly positioned with one edge of each strip substantially flush with one face of the wall in connection with which it will of course be noted that there is no joint filler strip at the present in the joint except for the narrow strips 11d adjacent to the exterior surfaces of the wall structure.

The various forms of the joint strips as indicated in the various modifications of Figure 3 allow for the following: In the use of joint strip 11 positioned as indicated there is provision for suitably pointing up joints at the exterior wall face which pointing may of course be with any suitable pointing compound as may be desired. Further, the projection of the strip from the rear face of the masonry wall provides for an air space between the back face of the wall and any interior sheathing or finish such as the sheet of material indicated at 13 as secured against the rear edge of joint strip 11 as by nailing with nails 14 or secured by other appropriate means such as screws or the like driven into or screwed into the joint strip material 11. Joint strip 11a merely provides for pointing up along the front face of the wall but otherwise serves no function other than its normal function as a joint forming member. The modified form of strip 11b extending from a flush relation with respect to the face of the wall does not allow for pointing of the joint but this strip does project from the rear face of the wall and may serve for the attachment of sheets of the interior finish or the like as described in connection with the joint strip 11.

Joint strip 11c when applied as shown in the drawing allows for pointing at the front face and for the mounting of an interior finish spaced from the rear of the wall structure but as will be apparent, the joint strip 11c may be modified in accordance with the construction illustrated in connection with each strips 11, 11a and 11b and this strip 11c may be used in the same manner as may be used in any of the such other strips. In constructing a masonry wall in accordance with the invention hereof where an interior finish material 13 is to be mounted on the rear portions of such strips in spaced relation to the rear face of the wall as particularly illustrated, it is preferable that the joint strips to which the sheet material 13 is to be secured shall be provided in the wall construction in staggered relation as is most clearly illustrated in Figure 1 of the drawing, wherein it is readily apparent that in the various courses only certain sections of the joint strip extend outwardly from the rear face of the wall, preferably every other strip in each course projecting rearwardly for the attachment of the interior sheet 13, with such projection of the joint strip material in the various courses alternating so that as is apparent particularly in Figure 1 the space between the rear face of the interior finish 13 is open for the circulation of air therethrough but with the space so broken up due to the overlapping of the projecting portions of the joint strip that the circulation of air in the air space is through tortuous passages which construction is more to be desired than one wherein each of the sections of the joint material 11 in each of the courses projects to the rear which would result in the formation of relatively small closed dead air chambers. A limited air circulation in the air space is desired and this is achieved in accordance with the construction as has just been described.

In a wall constructed in accordance with the above description, utilizing the joint strip 11 as has been particularly described, there may be constructed a wall which has surprising strength in that the weight of the masonry units 11 causes small irregularities in the top and bottom faces of the masonry units 10 to be firmly and solidly bedded on the compressible joint strips 11 and that due to the coating of asphalt or the like upon the surfaces of the joint strips 11 as described the faces of the units 10 under the influence of the weight of the wall structure become firmly adhered to the surface coating.

A wall constructed in accordance with the invention hereof is much more waterproof than the ordinary masonry wall constructed with mortar joints since notoriously unless every precaution is taken rain or water from other sources is very commonly driven through or seeps through the mortar joints causing damage in the wall structure or to the interior construction forming a part thereof. The joint strip material 11 prepared as described is waterproof and due to the firm adherence which is obtained between the faces of the blocks 10 and faces of the strips 11 it is impossible for moisture to get through the wall at the joints.

Whereas a preferred construction in connection with wall structure has been described, it is to be understood that in lieu of the specific joint strip material particularly described there may be utilized other strip materials which will serve the same function and in connection therewith there may be used for example, strips of formed products manufactured from suitable wood shavings adhered into particular form with a suitable cement or adhesive, or any other form of sheet material which has good coherence and which is to a limited extent compressible so that as has been hereinbefore indicated it has the required ability to compensate for slight surface irregularities and the like in the blocks 10 so that a full and secure surface to surface contact may be obtained between the strips 11 and blocks 10.

In the utilization of the invention hereof, various modifications and variations which are within the scope hereof may be utilized and it is the

intent that all such modifications and variations which would be apparent to those skilled in the art in connection with the utilization of the invention hereof shall be considered as coming within the scope of the invention disclosed.

The invention hereof having been disclosed in detail, I claim:

1. In a dry masonry wall construction, the combination with a plurality of superposed courses of masonry units, of courses of strip form joint forming material between superposed masonry courses, the strip form joint material comprising felted fiber board saturated with an asphalt of between 110 and 180 degrees F. melting point, the saturation of the felted fiber sheet being only to the extent of between 110 and 200 percent of the weight of the fiber board whereby the interstitial spaces and voids of the fiber sheet are incompletely filled with the saturant.

2. The combination with a masonry wall construction comprising a plurality of superposed of courses of masonry units, courses of strip form joint forming material between superposed masonry courses, the strip form joint material comprising felted fiber board saturated with an asphalt of between 110 and 180 degrees F. melting point, the saturation of the felted fiber sheet being to the extent of between 100 and 200 percent of the weight of the fiber board, and the fiber board sheet also coated upon surfaces thereof with a thin layer of such asphalt.

3. In a masonry wall construction alternate courses of masonry units and compressible strip form joint material, the strips of joint forming material comprising fiber board impregnated with an asphalt of between 110 and 180 degrees F. melting point, the impregnation being to the extent of incompletely filling the interstitial spaces and voids of the fiber board, the strips of joint forming material having the end portions thereof formed for overlapping engagement with complementing ends of one another and providing closed joints between adjacent strips sealed by pressure and providing a continuous unbroken seal between contiguous courses of the masonry units.

4. In a masonry wall construction, the combination with courses of masonry units, of courses of strip form joint forming material between superposed masonry courses, the strip form joint material comprising fiber board saturated with an asphalt of between 110 and 180 degrees F. melting point, the saturation of the fiber board being to the extent of between 100 and 200 per cent of the weight of the fiber board, a part at least of the strip form joint forming material extending a substantial distance beyond a face of the masonry wall whereby to receive and support other structural members and serving for the attachment of said other structural members in spaced relation with respect to the surface of the masonry wall.

5. A masonry wall comprising courses of masonry units, courses of strip form joint material adapted for dry masonry construction between the masonry courses, the masonry wall having mounted adjacent a face thereof but spaced therefrom other structural members secured to portions of the joint forming material, the joint forming material composed of relatively rigid asphalt impregnated nail receiving and retaining materials and having portions extending from the joints exteriorly of the general plane of the surface of the masonry wall and constituting furring means to which said other structural members are secured spaced from the masonry wall, the joint forming material comprising felted fiber board saturated with an asphalt of between 110 and 180° F. melting point, the saturation of the fiber board being to the extent of between 100 and 200 per cent. of the weight of the fiber board.

6. The combination with a masonry wall construction comprising courses of masonry units, of courses of strip form joint forming material between superposed masonry courses, a part at least of the strip form joint forming material extending beyond a face of the masonry wall and serving for the attachment of other structural members in spaced relation with respect to the surface of the masonry wall, and portions of said joint forming material extending beyond a face of the masonry wall offset laterally with respect to other portions thereof, whereby circulation of air will take place between the aforesaid wall construction and attached structural members.

7. The combination with a masonry wall construction comprising a plurality of superposed courses of masonry units, of courses of strip formed joint forming material between superposed masonry courses, the strip form joint material comprising spaced strips of felted fiber board having asphalt integrally distributed therethrough, but incompletely saturating the said strips, and secured in spaced relation by attachment in such spaced relation to a fibrous spacing sheet whereby there is provided an enclosed insulating body of air between the spaced joint-forming strips and within each joint between contiguous courses of the mesonry.

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