Dec. 27, 1927.

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L. B. McMILLAN

INSULATION CONSTRUCTION

Filed Jan. 10, 1925

Fig. 1.

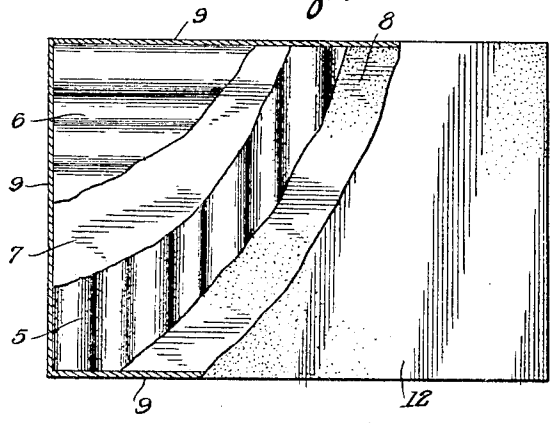


Fig. 2.

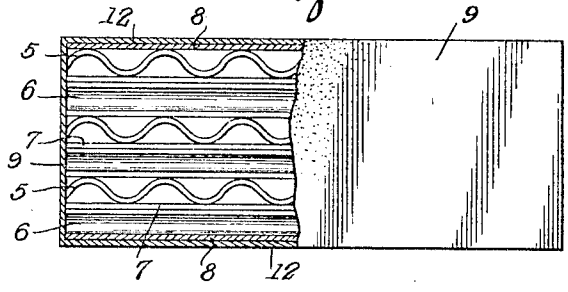


Fig. 3.

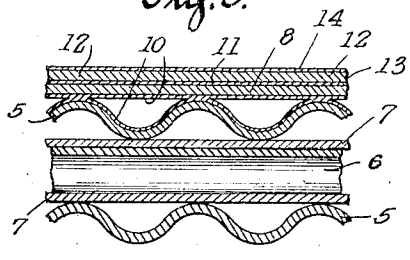
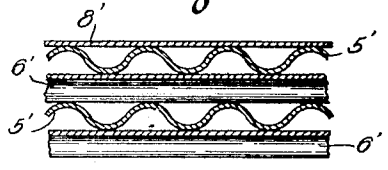


Fig. 4.



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UNITED STATES PATENT OFFICE.

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INSULATION CONSTRUCTION.

Application filed January 10, 1925. Serial No. 1,512.

My invention relates to an insulation construction and particularly to that class of insulation construction which includes a block or section built up of a plurality of felts cemented or otherwise secured together.

Built-up constructions of the character just indicated, as heretofore made, have lacked mechanical strength, or those constructions which have been reinforced with metallic inserts or otherwise strengthened have been relatively heavy, are costly to manufacture and often lack the essential quality of being good insulators.

It is an object of my invention, therefore, to provide a construction in which the objections heretofore noted will be in a large measure overcome and to provide a built-up construction which will have good insulating qualities, will be extremely light, will be relatively cheap to manufacture, and which will possess great mechanical strength.

It is a more specific object to provide a construction in which there are one or more corrugated or irregular-shaped felts, in which at least one side of the latter is completely covered or coated on one side with a stiffening cement, so as to secure an adjacent felt thereto and to provide stiffened arches or trusses to give mechanical strength to the construction.

It is a further object to provide an insulating block including felts secured together, the block being completely enclosed by cover felts secured to the interior part so as to provide a unitary block or section having stiffened arches to give rigidity to the block.

It is still another object to provide an insulation construction having a plurality of arch trusses, each of which is completely coated on the inside with a stiffening cement so as to impart relatively great mechanical strength to the completed structure.

It is a further object to provide an insulation construction with stiffened arches to impart mechanical strength and having a moisture proof coating on the outside.

Briefly stated, my invention in its preferred form includes a plurality of corrugated felts of asbestos paper or similar material, superposed one above the other, either with or without the interposition of flat felts between the corrugated felts. The various felts forming the block are preferably cemented or otherwise secured together at a sufficient number of points to cause the same to form a unitary block. Cover felts, preferably flat, are applied over the interior construction and are cemented in place so as to form a complete block which is entirely enclosed, so as to exclude moisture and so as to form enclosed air cells on the interior. At least one felt, preferably the outer one, and the adjacent corrugated felt are completely coacted or covered on adjacent sides with cement, which serves to secure said felts together and forms a plurality of stiffened arch trusses for giving mechanical strength to the body. The outer sides of the cover felts may be waterproofed and are preferably coated or impregnated with cement or other refractory material for resisting high temperatures, and rendering the block somewhat water resistant. If desired I may employ an additional cover felt or envelope on the outside which may be coated or impregnated with some good waterproofing material to render the finished block moisture proof.

In the drawings, which show, for illustrative purposes only, preferred forms of the invention—

Fig. 1 is a top plan view of an insulating block embodying features of my invention, parts being broken away to expose the interior construction;

Fig. 2 is a side view of the block shown in Fig. 1 with a part of one of the side cover felts removed;

Fig. 3 is a relatively enlarged exaggerated view of a part of an insulating block embodying features of my invention;

Fig. 4 is a fragmentary sectional view illustrating a slightly modified form.

In the drawings, 5—5 indicate corrugated felts with the corrugations running in one direction, while 6—6 indicate corresponding felts interposed between the felts 5—5 and having corrugations extending at right angles to the corrugations in the felts 5—5. Flat felts 7—7 may be interposed between the various corrugated felts if desired. These felts may be formed of any suitable material, such as asbestos paper or similar material. The corrugated felts and interposed flat felts are preferably secured to each other by cement or otherwise at suitable points, such as along the ridges on the respective corrugations which are in contact with the next adjacent felts.

In the practical embodiment of the inven-

tion a sufficient number of corrugated and flat felts superposed one above the other, to form a block of the requisite thickness. All six sides of the rectangular block shown are closed by cover felts, such as the top and bottom cover felts 8—8 and the side and end cover felts 9—9. These cover felts if separate from each other, may be cemented or otherwise secured to the interior block of felts and to each other so as to form a completely enclosed construction. Each of the cover felts may be coated, preferably on both sides, with a suitable refractory cement for rendering the block fireproof and also imparting moisture resistant qualities thereto. In Figs. 1 and 2 the cover felts, as well as the upper and lower outer corrugated felts, have been stippled to indicate the refractory cement coating.

As shown more particularly in Fig. 3, the outer corrugated felt 5 and adjacent upper cover felt 8 are completely coated on adjacent sides with suitable refractory stiffening cement 10, so as to secure the cover felt to the corresponding corrugated felt and to form hollow arch trusses completely coated on the inside with cement. The outside of the cover felt 8 may be also coated with cement 11, as has been indicated heretofore. The lower corrugated felt 6 and the corresponding cover felt 8 are preferably similarly treated. It will be seen that the insulating block having arch trusses at the upper and lower sides as described, is possessed of great mechanical strength and rigidity. The corrugations in the extreme upper and lower felts are preferably disposed at an angle to each other, as shown so that great resistance to bending in all directions is given to the block.

By a construction as above described a block is formed in which there are a great number of air cells formed by the various felts, so that the block will have good insulating qualities and, due to the cement coated corrugated felts and corresponding cover felts great mechanical strength is imparted to the block. There are no expensive reinforcements or inserts in the block, and the entire construction is exceedingly light due to the fact that all or most of the felts on the interior of the block are not cement coated but are left in a soft or normal state. The process of applying the cement is a simple, well understood and inexpensive one.

Since the entire body is enclosed and preferably coated with heat and moisture resistant cement, the block will retain its insulating properties almost indefinitely, and is capable of sustaining comparatively great mechanical load. The feature of lightness, combined with great mechanical strength and efficient insulating properties is of great importance in situations, such as on shipboard, where added weight is always to be avoided.

In cases where an insulation construction of highly waterproof character is required, I prefer to provide an envelope for the insulating block, which envelope is impregnated or coated with waterproof material. In the illustrative form shown, I preferably employ outer felts 12—12 which are cemented or otherwise secured, as indicated at 13 in Fig. 3, to the cover felts 8—8. These envelope felts 12—12 are impregnated or coated with some good waterproofing material, as indicated at 14 in Fig. 3. In this form of construction the other outside felts 9—9 are also preferably impregnated or coated with the same waterproofing material. Thus by enveloping or coating the outside of the insulating block a waterproof construction results and the block will still retain the desirable mechanical strength heretofore mentioned.

Since the waterproofing material may also render the insulating block air tight, it may be desirable, when the block is subjected to great variations in temperature, to make openings or incisions at some point so as to permit the air to escape from the interior when the block is heated up.

In Fig. 4 is shown one of the ways in which the construction may be modified. In such modified form there are corrugated felts 5′—5′ and corrugated felts 6′—6′, with the corrugations extending at an angle to the corrugations of the felts 5′—5′. Instead of having flat felts interposed between the corrugated felts, as in the first form described, the felts 5′—5′ abut directly upon the felts 6′—6′ and are cemented or otherwise secured thereto at the points of contact between the felts. Outer cover felts, such as 8′, are preferably provided so as to form a closed block and the top and bottom cover felts and adjacent corrugated felts are coated with cement, so as to provide the stiffened arches, as in the other form described.

It will be obvious, without illustration, that this latest form of construction may be waterproofed, as heretofore described.

While it is desirable to have stiffened arches at the outer sides of the block so as to provide the stiffening means at the greatest distance from each other, it is of course obvious that the stiffened arches need not necessarily be at the outer sides and could be located between any two adjacent felts. The invention, however, does not contemplate that all the felts shall be stiffened, for such stiffening cement adds greatly to the weight and detracts from the insulating qualities of the product.

While I have described preferred forms of the invention, I do not wish to be strictly limited thereto, for changes may be made

within the scope of the invention as defined in the appended claims.

I claim:

1. As an article of manufacture, a rectangular insulating block including a plurality of corrugated felts one above the other, flat felts on the six sides of said block for forming a smooth exterior, the exterior corrugated sides of the outermost corrugated felts being substantially completely coated with cement and the adjacent inner surfaces of said flat cover felts being likewise coated with cement to cause the adjacent cover and corrugated felts to adhere to each other and form stiffened hollow arch trusses to resist bending of said block, said remaining four cover felts being secured to the edges of the corrugated felts and to the adjacent edges of said other two cover felts, and the outer surfaces of the finished block being coated with waterproofing material.

2. As an article of manufacture, an insulating block including a plurality of corrugated felts one above the other, flat felts interposed between said corrugated felts, flat cover felts for the outside corrugated sides of the two outer felts, said two outer corrugated felts and corresponding cover felts being coated on adjacent sides with cement to cause the same to adhere to each other and form stiffened arches, and a waterproof envelope enclosing said felts forming the block.

3. As an article of manufacture, an insulating block including a plurality of alternate corrugated and flat felts one above the other with flat felts on the outside, the inner surfaces of the outside flat felts and the adjacent surfaces of the corrugated felts being coated with cement to form stiffened arches to resist bending of the block, and waterproofed envelope felts enclosing all of said first mentioned felts so as to form an enclosed block.

4. As an article of manufacture, an insulating block including a plurality of corrugated felts with the corrugations of adjacent corrugated felts lying at an angle to each other, outer cover felts completely enclosing said plurality of corrugated felts, the outer corrugated felts and the adjacent cover felts being completely coated on adjacent sides with cement for securing said felts together and forming stiffened arches to resist bending of said block.

5. As an article of manufacture, an insulating block including a plurality of corrugated felts, outer flat cover felts completely enclosing said plurality of corrugated felts on all sides so as to form a smooth exterior surface on all sides of said block, the outside corrugated felt at one side and the corresponding flat cover felt being substantially completely covered on adjacent sides with cement to hold said two felts together and form stiffened arches to resist bending of said block.

6. As an article of manufacture, an insulating block including a plurality of corrugated felts, the corrugations of the felts at opposite sides of said block being disposed at an angle to each other, cover felts for said opposite sides of said block, the faces of said corrugated felts adjacent said cover felts being substantially completely covered with cement to secure the same and the adjacent cover felts together and form stiffened arches to resist bending of said block, the interior felts of said block being left in a soft state.

7. As an article of manufacture, an insulating block including an outer corrugated felt and a cover felt therefor, the surfaces of the adjacent faces of said felts being covered with cement to secure the felts together, and form a plurality of stiffened arches for resisting bending of said block, and a plurality of soft felts below said cover felt and adjacent corrugated felt.

8. As an article of manufacture, an insulating block including an outer corrugated felt and a cover felt therefor, the outer surface of said corrugated felt being coated with cement which secures the cover felt thereto, to form a plurality of stiffened arches to resist bending of said block, and a plurality of soft felts in layers below said arches.

9. As an article of manufacture, an insulating block including a corrugated felt and a cover felt therefor, the adjacent surface of said corrugated felt being completely coated with cement to secure the cover felt thereto and form stiffened arches to resist bending of said block, and a plurality of soft felts in layers at one side of said first-mentioned felts.

10. As an article of manufacture, an insulating block having a plurality of closed hollow arch trusses, said hollow trusses being completely coated on the inside with a continuous coat of cement to stiffen the same and resist bending of said block, said block including a plurality of superposed soft felts at one side of said arch trusses.

11. As an article of manufacture, an insulating block including a plurality of alternate corrugated and flat felts one above the other, the adjacent faces of one of said flat felts and next corrugated felt being coated with cement to cause the same to adhere to each other and form stiffened arches to resist bending, some of said plurality of felts being left in a soft state.

12. As an article of manufacture, an insulating block including a plurality of corrugated felts with the corrugations of adjacent corrugated felts lying at an angle to each other, cover felts for the corrugated sides of the outer corrugated felts, the ad-

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jacent surfaces of said outer corrugated felts and corresponding cover felts being coated on adjacent sides with cement for securing said felts together and forming stiffened arches to resist bending of said block, the interior felts being relatively soft and not coated with cement whereby the block is strong, yet light in weight, and possesses high insulating properties.

13. As an article of manufacture, an insulating block including a plurality of corrugated felts with flat felts interposed between at least some of said corrugated felts, cover felts for the corrugated sides of the outer corrugated felts, the adjacent surfaces of said outer corrugated felts and corresponding cover felts being coated on adjacent sides with cement for securing said felts together and forming stiffened arches to resist bending of said block, the interior felts being relatively soft and not coated with cement whereby the block is strong, yet light in weight, and possesses high insulating properties.

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