Nov. 1, 1932. L. L. KNOX 1,885,607

METHOD OF MAKING COMPOUND WALL STRUCTURES

Original Filed May 14, 1926

Fig. 1.

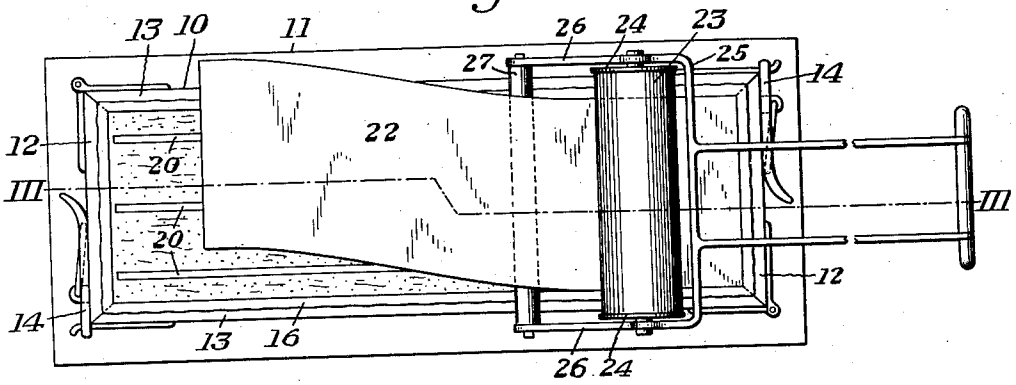


Fig. 3.

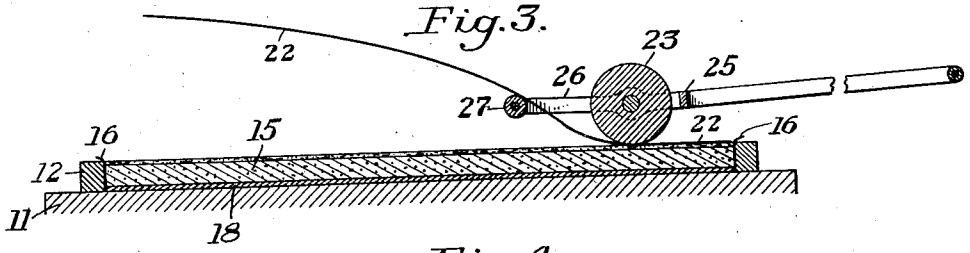


Fig. 4.

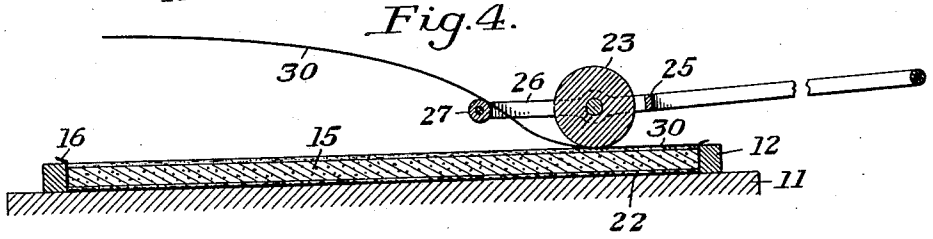
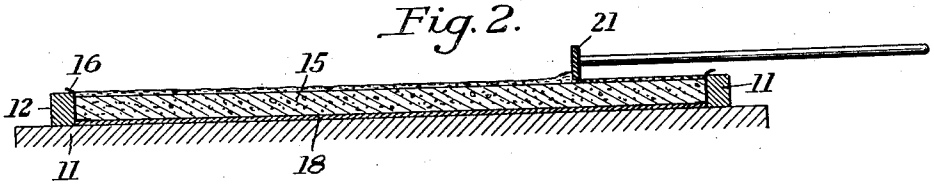


Fig. 2.



INVENTOR

Luther L. Knox

by Byrnes, Stebbins, Pannullee & Bleuke

Attys.

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UNITED STATES PATENT OFFICE

LUTHER L. KNOX, OF BELLEVUE, PENNSYLVANIA, ASSIGNOR TO KNOX PRODUCTS COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

METHOD OF MAKING COMPOUND WALL STRUCTURES

Original application filed May 14, 1926, Serial No. 109,182. Divided and this application filed December 9, 1929. Serial No. 412,656.

This invention relates generally to a method of making compound or composite wall structures, and more particularly to a method of making walls especially adapted for use in refrigerators, ice boxes, ice cream cabinets or the like in which effective heat insulation properties are desirable.

This application is a division of my copending application Serial No. 109,182, filed May 14, 1926.

Heretofore in the art of refrigeration, it has been proposed to utilize preformed slabs or blocks of insulating material, such as cork, and protect the same by outside coverings of steel or other suitable material. While such preformed slabs are highly desirable from the standpoint of permanency, they have been open to the objection that in order to maintain them properly positioned within the wall it has been necessary to provide a framework. Also, in actual use, the air circulation adjacent the insulating slabs or blocks precipitates moisture in the interior of the cork which subsequently becomes frozen and thereby destroys the effectiveness of the cork for insulating purposes.

The present invention provides a method of making a composite wall which is permanent structurally and which maintains its heat insulating properties permanently. Furthermore, in my process a structural supporting framework for maintaining the insulating slabs in position is unnecessary.

In the accompanying drawing which illustrates the present preferred embodiment of my invention.

Figure 1 is a top plan view of apparatus suitable for carrying out the process;

Figure 2 is a longitudinal vertical section illustrating the method of applying the binding material;

Figure 3 is a section on the line III—III of Figure 1 illustrating the method of uniting a protective sheathing with the binding material; and

Figure 4 is a view similar to Figure 3 showing a sheathing being applied to the opposite side of the insulating body.

In carrying out the method of making a composite wall, a frame 10 is placed on a supporting plate 11. The frame is made up of end sections 12 and side sections 13. The side sections and end sections are held together by clamps 14 which enable an insulating body 15 placed within the frame to be compressed both transversely and longitudinally by the operation of drawing the side and end sections of the frame together. After the frame 10 has been placed on the supporting plate 11, the frame is lined with a lining 16 of paper or similar material. A filler slab 18 is then placed within the frame and supported by the plate 11. The insulating body 15 is then placed on top of the filler slab 18. The frame 10 is preferably of a height somewhat greater than the thickness of the insulating slab.

In the preferred form, the height of the frame 10 is the same as the thickness of the composite wall structure which it is desired to make. Spacers 20 are then placed on the exposed surface of the insulating body and the top surface of the insulating body is coated by flowing in binding material. The binding material is leveled off by means of a tool 21, as illustrated in Figure 2. A protective sheathing 22 is then applied to the top of the binding material and the sheathing is caused to adhere to the binding material by applying pressure thereon.

As illustrated in Figures 1, 3 and 4, the means for applying pressure to the sheathing comprises a roller 23 having flanges 24 at its ends which cooperate with the side sections 13 of the frame in order to guide the roller as it is made to traverse the frame. The roller 23 is mounted in a roller frame 25 having arms 26 which form bearings for a small roller 27. In the rolling operation, the roller 27 maintains the sheathing 22 out of the way of the roller 23, so that the sheathing is applied without waves to the binding material and, when pressure is exerted thereon by the roller 23, it is firmly united with the binding material.

After the top surface of the insulating body 15 has had a coating of binding material applied thereto and a top sheathing has been secured to the binding material, the frame 10 is inverted and the filler slab 18 removed.

Spacers 20 are placed on the exposed surface of the insulating block and binding material and a second sheathing 30 are applied, as previously described. In Figure 4, the method of applying the second sheathing 30 is illustrated.

The binding material which I utilize is preferably of such nature that it liquefies under heat and remains in a semi-solid condition at normal temperatures. Such a material not only imparts desirable sound deadening characteristics to the structure in which the composite wall is used, but serves to effectively unite the insulating material and the protective covering whereby the inner and outer protective sheathings are tied together and the entire assembly held rigidly in place. Such a filling may comprise artificial asphalt, natural asphalt, or similar material. While such material effectively adheres not only to the insulating body but to the protective sheathings, I have found that it is possible to use a wide variety of different materials for preliminarily coating the inner surfaces of the protective sheathings prior to applying the sheathings to the binding material. Where preliminary coatings are used, I prefer to employ a solution of coal tar oils or similar material.

I have found that in certain types of compound wall structures, material such as sodium silicate may be used effectively in place of material of the type hereinbefore referred to. Where such material is used, the necessity of employing heat to liquefy the binding material is obviated.

It will be noted that by the employment of spacers, such as indicated by the reference numeral 20, the protective sheathings 22 and 30 are permanently and positively maintained in spaced relation to the insulating body. The spaces between the surfaces of the insulating body and the inner surfaces of the protective sheathings are completely filled with binding material which, in addition to imparting sound deadening properties to the wall, permanently secures the sheathings and insulating body together. The binding material serves as an effective means for preventing air circulation and this, in turn, prevents the condensation of moisture.

I have described in detail the present preferred method of practicing my invention and have illustrated and described apparatus for practicing the process. It is to be understood, however, that the invention may be otherwise embodied or practiced within the scope of the following claims.

I claim:

1. The method of making compound wall structures, comprising arranging a solid nonplastic insulating body in a frame, coating at least one side of the body with a binding material, placing a protective sheathing on the coated body, and exerting pressure on the sheathing to cause it to adhere to the binding material while maintaining it in positive spaced relation to the insulating body.

2. The method of making compound wall structures, comprising arranging a solid nonplastic insulating body in a frame, coating at least one side of the body with a binding material, placing a protective sheathing on the coated body, and exerting pressure on the sheathing to cause it to adhere to the binding material while maintaining it in positive spaced relation to the insulating body by means other than the binding material itself.

3. The method of making compound wall structures, comprising arranging a solid insulating body in a frame, placing spacers on at least one side of the body, coating the side of the body having the spacers thereon with a binding material, and uniting a sheathing with the binding material by exerting pressure on the sheathing while maintaining it in positive spaced relation to the insulating body.

4. The method of making compound wall structures, comprising arranging a solid insulating body in a frame, placing spacers on at least one side of the body, coating the side of the body having the spacers thereon with a binding material, the coating being of a thickness at least equal to the height of the spacers, and uniting a sheathing with the binding material by exerting pressure on the sheathing while maintaining it in positive spaced relation to the insulating body.

5. The method of making compound wall structures, comprising arranging a solid insulating body in a frame, placing spacers on at least one side of the body, coating the side of the body having the spacers thereon with a binding material, and uniting a sheathing with the binding material by exerting rolling pressure on the sheathing while maintaining it in positive spaced relation to the insulating body.

6. The method of making compound wall structures, comprising lining a frame with paper or the like, arranging a solid insulating body within the frame, coating at least one side of the body with a binding material, placing a protective sheathing on the coated body, and exerting pressure on the sheathing to cause it to adhere to the binding material while maintaining it in positive spaced relation to the insulating body.

7. The method of making compound wall structures, comprising supporting a solid insulating body within a frame by a filler, placing spacing means on the exposed side of the body, coating the exposed side with a binding material, uniting a protective sheathing with the binding material by exerting rolling pressure thereon, inverting the frame, removing the filler, applying binding material to the opposite side of the body, and uniting

another protective sheathing with the binding material on said opposite side.

8. The method of making compound wall structures, comprising arranging a solid non-plastic insulating body in a frame, coating at least one side of the body with a binding material of such nature that it liquefies under heat but remains in a semi-solid condition at normal temperatures, placing a protective sheathing on the coated body, and exerting pressure on the sheathing to cause it to adhere to the binding material while maintaining it in positive spaced relation to the insulating body.

In testimony whereof I have hereunto set my hand.

LUTHER L. KNOX.