Dec. 8, 1953 L. E. BUTLER ET AL 2,661,769

INSULATED AIR DUCT

Filed April 8, 1950

FIG. I.

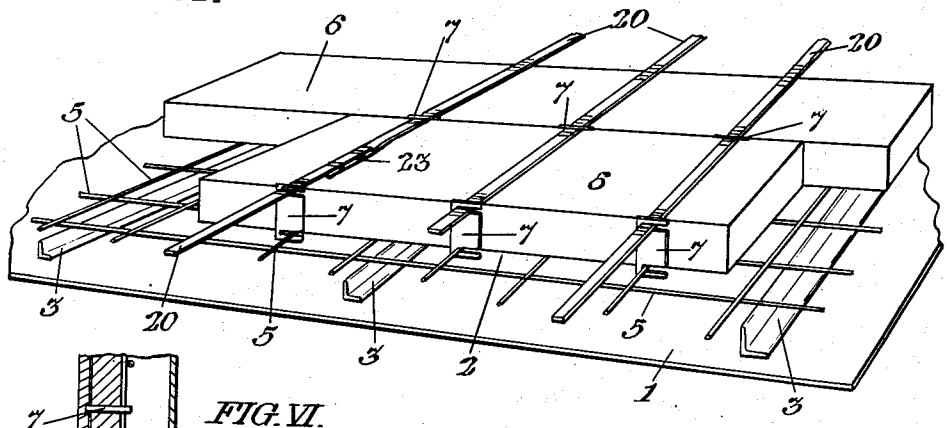


FIG. VI.

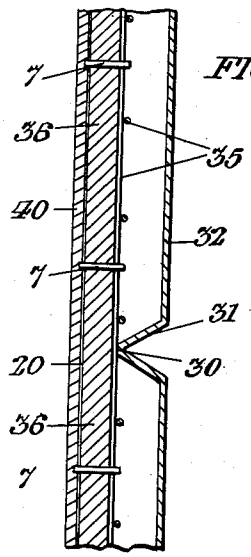


FIG. III.

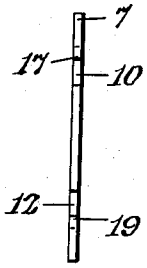


FIG. II.

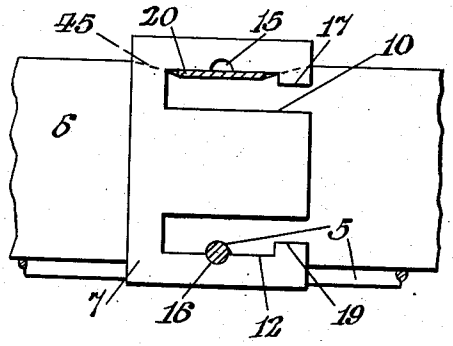


FIG. IV.

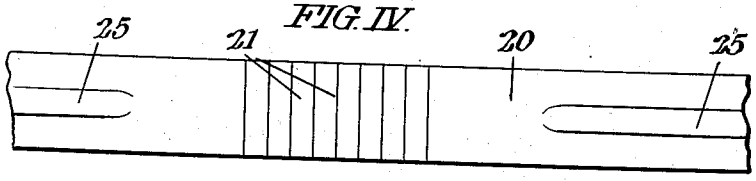
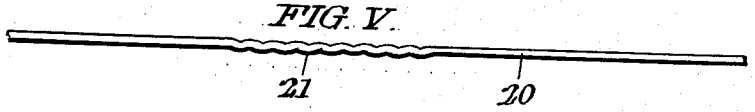


FIG. V.



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INSULATED AIR DUCT

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5 Claims. (Cl. 138—64)

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Our invention relates to improvement in insulated air duct, and more particularly to means for and method of applying block insulation on breechings and ducts.

One object of our invention is to provide means by which blocks of insulation may be readily and facilely applied on breechings or ducts without the necessity of wiring and tying the insulation blocks on the breechings or ducts.

Another feature of our invention is that by the use of our improved means and method of applying insulation blocks on breechings or ducts, the multiple manual operations necessarily performed in connection with such wiring and tying are eliminated.

Another feature of our invention is that the block insulation may be applied to breechings and ducts by unskilled or semi-skilled labor when our improved means and method are used.

Another feature of our invention is that the costs of applying block insulation by our improved means and method are greatly reduced over the costs involved when block insulation is applied by the prior art method of wiring and tying the block insulation to the breechings or ducts.

Another feature of our invention is that block insulation may be applied to breechings or ducts far more expeditiously by the use of our improved means and method than with the use of any of the prior art means or methods.

Although we have shown and described our invention in connection with the applying of block insulation to breechings or ducts, it is to be understood that our improved means and method may be used for many other applications and purposes.

Our invention includes the various novel features of construction, arrangement, and method hereinafter more definitely specified with reference to the accompanying drawings.

In said drawings:

Fig. I is a small scale somewhat diagrammatic view of an air duct on which block insulation has been partly applied by use of our improved means and method.

Fig. II is an approximately full scale view of our improved clip means of a size used for applying insulation block of approximately 1½" in thickness.

Fig. III is a side elevation of the clip means shown in Fig. II.

Fig. IV is an approximately full size fragmentary plan view of our corrugated band means.

Fig. V is a side elevation of the fragment of corrugated band means shown in Fig. IV.

Fig. VI is a small scale somewhat diagrammatic view of an air duct of the connery expansion joint type on which block insulation has been applied by our improved means and method.

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Referring to Figs. I to V inclusive of said drawings; the metal portion of a breeching or air duct on which block insulation is applied is indicated generally at 1 in Fig. I. When covered with block insulation, a resultant closed breeching or duct is formed which has an air space 2 through which air or gases are conveyed.

A series of spacing means, such as angle bars 3 of a dimension equal to the desired heighth of the duct, are mounted on the metal flat surface of the breeching or duct 1. Wire mesh 5 of a desired gauge and mesh, say #6 gauge with 6" x 6" openings, is laid on the upper edges of the angle bars 3 and secured thereto by any convenient means, such as by spot welding, to form said air space 2 between the metal of the duct 1 and the pre-formed insulation blocks 6 which are supported by and secured on the wire mesh 5, as hereinafter described.

Our improved means for securing the block insulation 6 on the wire mesh 5 includes clips 7 which, conveniently, are substantially rectangular in shape and provided with oppositely counterpart slots or openings 10 and 12. The upper edge of the slot 10 and the lower edge of the slot 12 are provided with respective notches 15 and 16, conveniently of approximately the same size as the radius of the wire used in forming the wire mesh 5. The slots 10 and 12 of the clip 7 are provided with inward projections 17 and 19 to prevent lateral displacement of the securing bands 20, or the engaged wire of the wire mesh 5, as hereinafter described. The clips 7 are formed with oppositely counterpart slots 10 and 12 merely as a matter of convenience so that either the slot 10 or the slot 12 may be used for securely engaging either the wire mesh 5 or a securing band 20 without the necessity of the duct erector turning the clip around when installing the block insulation 6 on the duct. When the clips 7 are formed with oppositely counterpart slots, the notch 15 of the slot 10 formed in the clip 7, as shown in Fig. II, performs no utilitarian function when a securing band 20 is engaged in the slot 10.

The clips 7 are of varying sizes depending upon the thickness of the insulating blocks to be installed on the duct. In Fig. II we have shown, approximately full size, an insulating block 6 of 1½" in thickness with a clip 7 of substantially the dimensions as would be utilized in the installation of insulating blocks of 1½" thickness. We have found it desirable to form the clips 7 of such dimensions that the distance between the upper edge of the slot 10 and the lower edge of the slot 12 is approximately one-eighth of an inch less than the thickness of the insulation blocks to be installed, to enable the blocks 6 to be held tightly between the bands 20 and the wire mesh 5.

As best shown in Figs. I, IV and V; the securing bands **20** are formed, conveniently, in strips which are provided at predetermined spaced apart intervals with a series of corrugations or serrations **21**. The distance between the corrugations **21** depends upon the width of the insulating blocks **6** which are to be applied. We find it convenient to provide the bands **20** with stiffener beads **25**, formed between respective corrugations **21**, to give additional strength to said bands **20**. Of course, the ends of two bands **20** may be secured together, as indicated at **23** in Fig. I.

When our invention is used to apply block insulation to a duct of the connery expansion joint type, as indicated in Fig. VI; the apices **30** of the connery expansion joints **31** of the duct **32** are used to support the wire mesh **35**, with the wire mesh **35** secured to the apices **30** in the same manner as described above with reference to the securing of the wire mesh **5** on the angle bars **3** in a duct of the construction shown in Fig. I. Insulation blocks **36** are mounted on the wire mesh **35** and secured thereto by clips **7** and securing bands **20**.

If desired, a finishing surface **40** may be applied to the outer surface of the insulation blocks **36** (or blocks **6**) in the manner which we have indicated in Fig. VI of the drawings.

Method of application

After the wire mesh has been secured to the air duct spacing means as heretofore described with reference to ducts such as shown in Figs. I and VI; a clip **7** is hung on the longitudinal wire of the wire mesh and an insulation block having dimensions of, say 12 inches in width and 24 or 36 inches in length is laid upon the wire mesh, with the longitudinal edge of the insulation block substantially parallel with the transverse wires of the wire mesh. A securing band **20** is placed upon the upper surface of the insulation block and the notch **16** in the lower slot **12** of a clip **7** is engaged around the longitudinal wire of the wire mesh **5**, and the securing band **20** positioned within the upper slot **10** of the clip **7**, as shown in Fig. II. The clip **7** is pushed along the corrugations **21** of the band **20** until the insulation block is securely bound and held on the wire mesh. Additional insulation blocks are secured in the same manner to form a row, as indicated in Fig. I. In fastening an insulation block on the wire mesh; we have found it desirable to have the insulation block so forcibly secured as to have the securing band **20** depress the upper surface of the insulation block **6** as indicated at **45** in Fig. II, and with the clip engaged wire of the wire mesh **5** correspondingly indentedly secured in the bottom surface of the insulation block **6**.

Additional rows of block insulation in abutting relationship to the erected first row are applied in the same manner, with the new row of block insulation placed beneath the extending free ends of the securing bands **20** used for the row of block insulation previously applied. Second and succeeding rows of block insulation are secured to the wire mesh and securing bands by additional clips **7**, in the same manner as heretofore described, until the breeching or duct has been completed, as desired.

We do not desire to limit ourselves to the precise details of construction, arrangement, and method herein set forth, as it is obvious that various modifications may be made therein without departing from the essential features of our invention, as defined in the appended claims.

We claim:

1. An air duct comprising an inner metal wall; fluid passageway spacing means formed in said metal wall; wire mesh mounted on the outer surface of said spacing means; outer pre-formed insulation blocks mounted on said wire mesh; securing bands overlying the outer surfaces of a multiplicity of said insulation blocks; and clip means rigidly securing said securing bands and insulation blocks to said wire mesh.

2. An air duct comprising an inner connery type expansion joint metal wall; wire mesh mounted on the outwardly extending apices of said expansion joints; outer pre-formed insulation blocks mounted on said wire mesh; securing bands overlying the outer surfaces of a multiplicity of said insulation blocks; and clip means rigidly securing said securing bands and insulation blocks to said wire mesh.

3. A duct comprising an inner metal wall; spacing means mounted on said inner metal wall and forming open fluid passageways between said spacing means; wire mesh mounted on the outer portion of said spacing means; outer preformed insulation blocks mounted on said wire mesh; securing bands overlying the outer surface of said insulation blocks; and clip means at the opposite sides of each insulation block rigidly securing said securing bands and each insulation block to said wire mesh; said clip means having an open end slot at one end thereof in which a securing band is secured and an open end slot including a notch portion at the opposite end in which a wire of the wire mesh is secured, said clip means being in engaging contact with the side surfaces of said insulation blocks.

4. A duct comprising an inner metal wall; angle bar spacing means mounted on said metal wall and forming open fluid passageways between said angle bar spacing means; wire mesh mounted on the outer upturned flanges of said angle bars; outer preformed insulation blocks mounted on said wire mesh; securing bands overlying the outer surface of said insulation blocks; clip means at the opposite sides of each insulation block rigidly securing said securing bands and said insulation blocks to said wire mesh; said clip means including an open end slot at one end thereof in which a securing band is secured and an open end slot including a notch portion at the opposite end in which a wire of the wire mesh is secured, said clip means being in engaging contact with the side surfaces of said insulation blocks; and means on said clips preventing the lateral displacement of said securing bands and said wire.

5. A structure as in claim 4, wherein said securing bands are provided with a multiplicity of corrugations selectively engaged by said band slot of said clip means.

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