Sept. 5, 1950 J. C. CRAWFORD, JR 2,520,914

INSULATING MATERIAL

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Fig. 1.

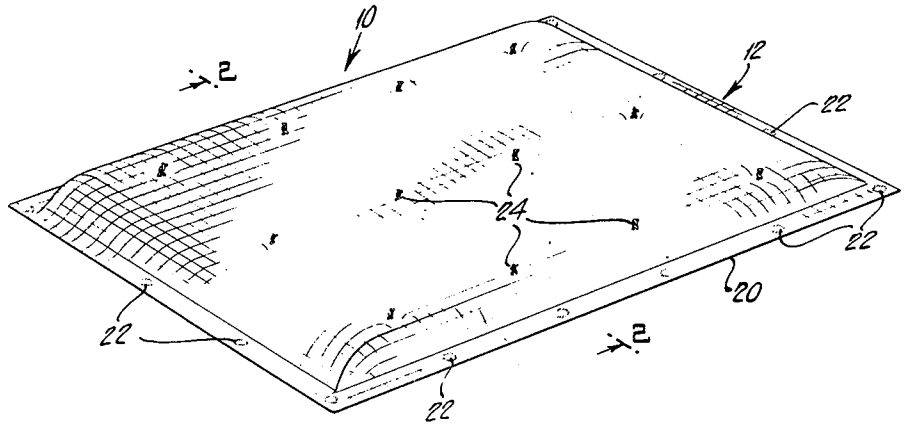
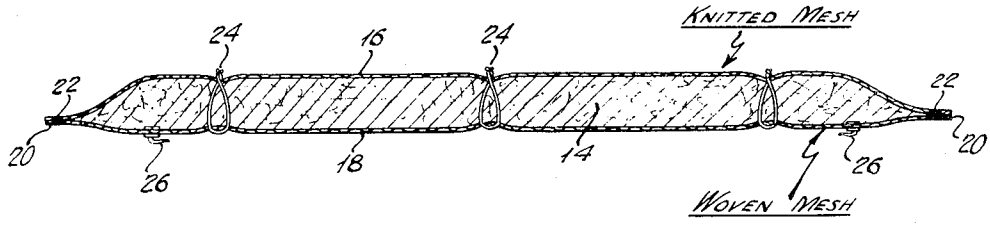


Fig. 2.



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INSULATING MATERIAL

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8 Claims. (Cl. 154—44)

1

The instant invention relates to insulating materials and, more particularly, to blankets or coverings to be employed to thermally insulate apparatus, fittings, flanges and other equipment subject to high temperatures. The present materials are especially adapted for application to curved or irregular surfaces. Heretofore, various types of insulation have been employed on such equipment, the insulations including asbestos envelopes filled with asbestos fiber, sectional molded blocks of various materials, and the like. The invention has for its principal object the provision of an improved product which can be readily applied and removed, which is resistant to high temperatures, and which may be used on curvilinear or irregular surfaces to lie closely thereagainst. Another object of the invention is the provision of a blanket of this type which will have improved handling properties.

A further object of the invention is the provision of an insulating blanket including a sheath and an insulating filling, the sheath having a face to be applied against the equipment to be insulated which is readily distortable and stretchable in any direction to conform to the contour of the equipment, the opposite face of the covering being relatively non-stretchable to maintain the integrity of the covering.

A still further object of the invention is the provision of a blanket as referred to above in which the face of the sheath to be placed against or adjacent the equipment is formed of a distortable, stretchable fabric composed of metal strands, highly resistant to heat.

My invention will be more fully understood and further objects and advantages thereof will become apparent when reference is made to the more detailed description of the preferred embodiment thereof which is to follow and to the accompanying drawing, in which:

Fig. 1 is a perspective view of an insulating blanket in accordance with the invention; and,

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1.

Referring now to the drawings, there is shown a blanket 10 particularly suitable for application to equipment of irregular or curvilinear surface contour and of such character that the insulation must be removed and replaced from time to time to permit access to the equipment. The blanket comprises a sheath 12 and an insulating filling 14. Sheat 12 is made up of separate fabrics 16 and 18 secured together along their marginal portions 20 to define a bag or envelope enclosing the filling 14.

Fabric 16 is employed on the face of the blanket to be exposed to high temperatures, that is, the face which is to be placed against the equipment to be insulated, and is composed of a knitted fabric, particularly a knitted metallic mesh. It has

2

been determined that relatively fine round or flat wires or cut strands of metals such as copper, steel or aluminum, or alloys, for example, bronze, nickel chrome alloys, chrome, nickel steels, nickel copper alloys, and the like, are suitable for use at temperatures substantially higher than those which can be successfully withstood by asbestos jackets, say, temperatures up to or above 1500° F. The fabric may be made on any conventional knitting machine adapted for the purpose. As indicated above, preferably relatively fine wires or cut metal strands are employed as the knitting strands. For example, a fabric knit from wire of a diameter of about 0.0045", the fabric having relatively small mesh openings, say, about $\frac{1}{16}$", serves satisfactorily for the present purpose. The use of such fine knitting strands provides a very flexible sheath and the relatively fine mesh openings insure against the loss of the filling material through the sheath. It will be understood, however, that the gauge of the wire and the size of the stitches may vary considerably from those given above, depending upon the particular application of the insulating blanket, the character of the filling material, and the like.

The fabric 16, due to its knitted structure, is readily distortable and may be stretched in either direction, notwithstanding the fact that it is composed entirely of the metal strands.

Fabric 18 forming the exposed or "cold" side of the sheath is of woven construction and may comprise woven strands of wire of the same type as employed for fabric 16. However, inasmuch as this face of the blanket is not ordinarily exposed to high temperatures, other materials may be used, such as asbestos strands, or the like. Metal strands are preferred and suitably a woven material of the type of a fly screen or hardware cloth is employed. For example, a 32 x 32 mesh hardware cloth fabricated of strands approximately 0.0065" in diameter has been found satisfactory.

As stated above, the sheath 12 is formed by securing the two fabrics together adjacent their marginal edges. Where both fabrics are of metal mesh this is preferably done by spot welding as indicated at 22. The welds are placed at suitable intervals to provide a relatively tight seam at the edges of the blanket. In lieu of welding, the fabrics may be soldered or stitched together, or other securing means may be used.

The insulating material 14 which fills sheath 12 is a heat-resistant, fibrous material, preferably asbestos fiber, such, for example, as the amosite fiber heretofore employed in prior constructions for similar purposes. Other known heat-resistant fibers, such as relatively long chrysotile asbestos fibers, glass fibers, mineral wool fibers and the like may be used.

The insulating filling is inserted within the

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flexible tube or sheath in any suitable manner to snugly fill the same. This may be accomplished by securing the fabrics together at three sides to form a bag or envelope with an open mouth, stuffing this bag with the filler and finally securing the fabrics together at the remaining side to close the mouth. Alternatively the fabrics may be placed on the opposite faces of a batt or section of the insulation of the desired size, and the fabric brought together at all four edges and secured. The tube or sheath is flattened into blanket form as shown in Fig. 1. The blanket is maintained in its flattened shape and shifting of the filling is prevented by stitching or quilting 24 at suitable intervals throughout the area of the blanket. Wire strands of the metal employed for the knitting strands of fabric 16 and which are capable of withstanding the high temperatures to which the blanket is to be exposed, are preferably used for the quilting ties. The blanket may be provided with suitable means to permit it to be laced or secured in position. For example, conventional practice may be followed by providing eyelets or hooks 26 adjacent the end edges of the blanket through or around which lacings may be drawn. It will be understood that other equivalent means may be employed for this purpose.

The blankets may be formed in any suitable size by properly dimensioning the fabrics 16 and 18. Also, the blankets may be made of any shape desired to fit special needs. The stretchable, distortable, knitted fabric on the face of the blanket to be exposed to the equipment permits the blanket to readily conform to irregular or curvilinear surfaces. The relatively non-stretchable fabric on the opposite face of the blanket at the same time prevents the blanket from becoming unduly distorted or stretched as a whole and imparts stability to the product. The use of a heat-resistant metal mesh, particularly for the fabric 16, enables the blanket to be used where relatively high temperatures are encountered without injury to the insulation. Inasmuch as the insulating filling is maintained in position entirely by the fabrics, the fact that the temperatures encountered may be higher than those which the asbestos will withstand without some disintegration will not effect the insulating or structural characteristics of the blanket. The blanket is easily handled.

Having thus described my invention in rather full detail, it will be understood that these details need not be strictly adhered to but that various changes and modifications may suggest themselves to one skilled in the art, all falling within the scope of the invention as defined by the subjoined claims.

What I claim is:

1. An insulating material comprising a flexible sheath having a facing formed of a readily flexible, distortable and stretchable fabric comprising heat-resistant strands, and an opposite facing formed of a relatively non-stretchable fabric in relatively non-stretchable condition, said fabrics being secured together adjacent the edges of the sheath, and a readily distortable, fibrous insulating filling within the sheath.

2. An insulating blanket comprising a flexible sheath having a facing to be exposed to high temperatures formed of a readily flexible, distortable and stretchable fabric comprising heat-resistant metal strands, and an opposite facing formed of a relatively non-stretchable fabric in a relatively non-stretchable condition, said fabrics being secured together adjacent the edges of the sheath, and a readily distortable, fibrous insulating filling within the sheath.

3. An insulating material comprising a flexible sheath having a facing formed of a readily flexible, distortable and stretchable fabric comprising heat-resistant strands, and an opposite facing formed of a relatively non-stretchable fabric in relatively non-stretchable condition, means securing the fabrics together adjacent their margins, means connecting said fabrics at intervals throughout the area thereof, and a readily distortable, fibrous insulating filling within the sheath.

4. An insulating blanket comprising a flexible sheath having a facing formed of a heat-resistant, knitted fabric, and an opposite facing formed of a woven fabric in a relatively non-stretchable condition, said fabrics being secured together adjacent the marginal portions thereof, and a distortable, fibrous insulating filling within the sheath.

5. An insulating blanket comprising a flexible sheath having a facing to be exposed to high temperatures formed of a knitted fabric comprising heat-resistant metal strands, and an oposite facing formed of a woven fabric in a relatively non-stretchable condition, said fabrics being secured together adjacent their margins, and a distortable fibrous insulating filling within the sheath.

6. An insulating blanket comprising a flexible sheath having a facing to be exposed to high temperatures formed of a knitted fabric comprising heat-resistant metal strands, and an opposite facing formed of a woven fabric in a relatively non-stretchable condition and comprising metal strands, said fabrics being secured together adjacent their margins to define a sheath, and a distortable fibrous insulating filling within the sheath.

7. An insulating blanket comprising a flexible sheath having a facing to be exposed to high temperatures formed of knitted fabric comprising heat-resistant metal strands, and an opposite face formed of a woven fabric in a relatively non-stretchable condition, means securing said fabrics together adjacent their margins, means connecting said fabrics at intervals throughout their areas, and a readily distortable fibrous insulating filling within the sheath.

8. An insulating blanket comprising a flexible sheath having a facing to be exposed to high temperatures formed of a knitted fabric comprising heat-resistant metal strands, an opposite facing formed of a woven fabric in a relatively non-stretchable condition and comprising metal strands, means securing said fabrics together adjacent their edges, means connecting said fabrics at intervals throughout their areas, said last-named means comprising metal ties, and a distortable fibrous insulating filling within the sheath.

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