April 6, 1943. G. B. BROWN ET AL 2,315,837

INSULATING COVERING

Filed March 23, 1940 2 Sheets-Sheet 1

Fig. 1.

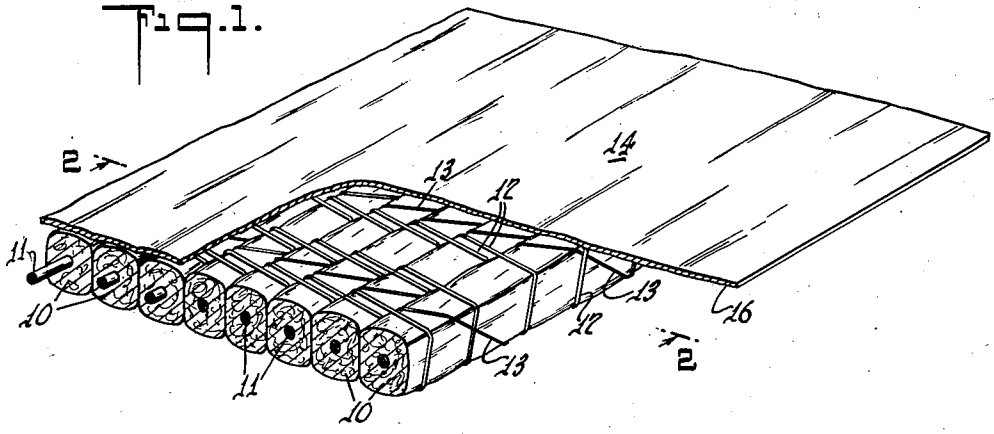


Fig. 2.

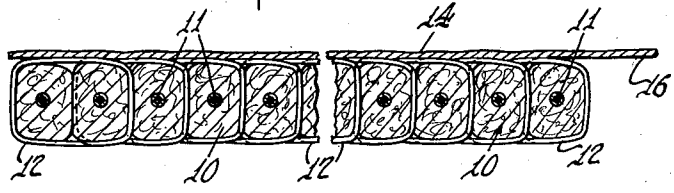


Fig. 3.

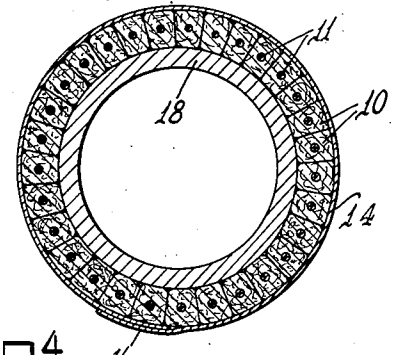


Fig. 13.

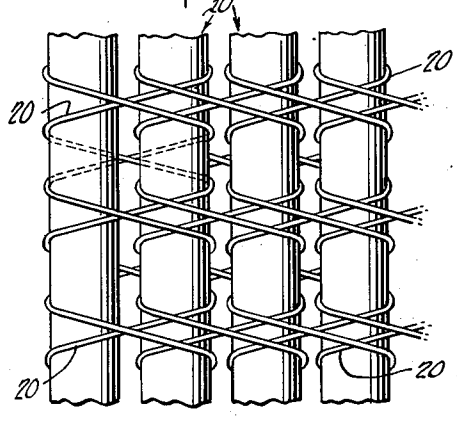
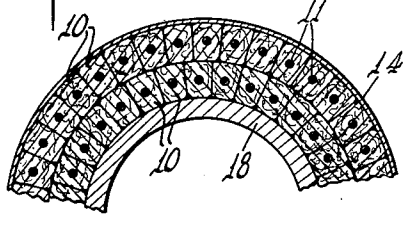


Fig. 4.



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Fig. 5.

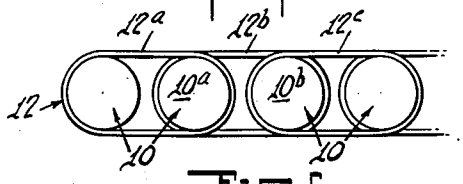


Fig. 7.

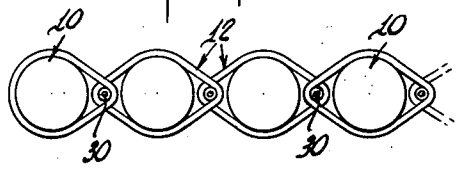


Fig. 6.

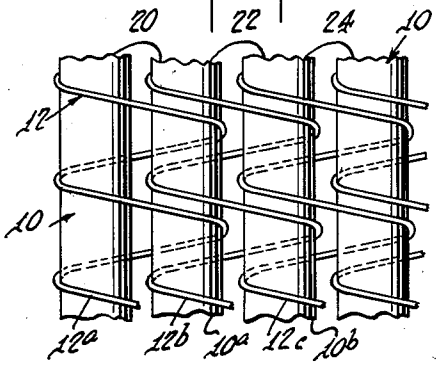


Fig. 8.

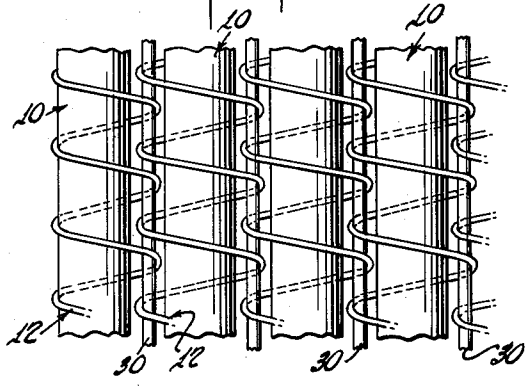


Fig. 11.

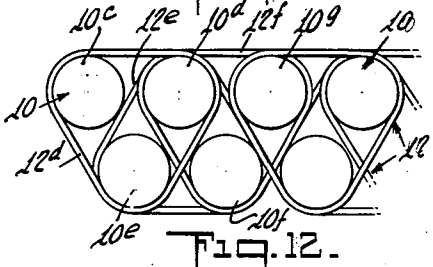


Fig. 9.

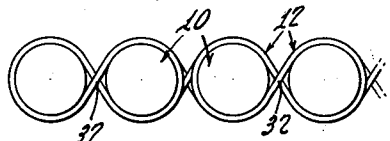


Fig. 10.

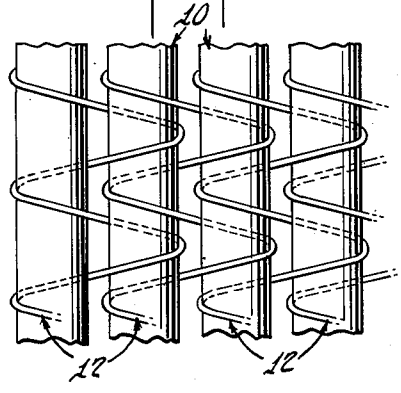
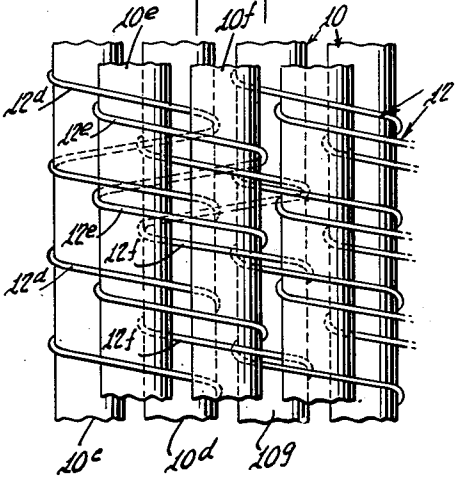


Fig. 12.



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UNITED STATES PATENT OFFICE

2,315,837

INSULATING COVERING

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Application March 23, 1940, Serial No. 325,547

18 Claims. (Cl. 96—26)

The present invention relates to thermal-insulating materials, and more particularly, to an insulating covering or blanket adapted to be applied around pipes, pipe fittings, and the like.

Insulating blankets or coverings of the type here under consideration are particularly for use where the insulation is to be cut to size and fitted on the job, for example, in covering pipe fittings, valves, and the like. However, the covering may also be employed in pre-cut sizes for use in substitution for other pipe insulation or for other purposes. The covering is of the type comprising a plurality of relatively large soft ropes or rovings having little or no twist assembled in blanket form. Heretofore, coverings of this type have been fabricated by a weaving operation, the rovings preferably forming the warp and small diameter strands of relatively high tensile strength forming the weft of the fabric. When such coverings are to be longitudinally divided, it is necessary to sever the weft strands with the result that their binding effect is greatly lessened and the covering loosens up, with the cords or rovings adjacent the line of severance separating from the covering and further contributing to the disintegration of the entire fabric. In an attempt to overcome these difficulties the severed ends of the wefts have been tied. This, however, is accompanied by great loss of time and material and difficulty in securing the necessary tightness of the covering.

The principal object of the invention is to provide an improved insulating blanket of the type referred to above which may be cut to desired widths with the severed sections retaining their compact fabricated form without the necessity of tying the binding strands or performing other operations subsequent to the cutting.

Another object of the invention is the provision of an insulating blanket which will permit of fabrication in a rapid and continuous operation.

A further object of the invention is the provision of a blanket of this type, in which the rovings or cords are closely drawn together, the blanket, however, retaining pliability to permit the same to conform to the surface of irregularly shaped objects.

Our invention will be more fully understood and further objects and advantages thereof will become apparent when reference is made to the more detailed description thereof which is to follow and to the accompanying drawings, in which:

Fig. 1 is a perspective view with parts broken away of a section of an insulating covering in accordance with the invention;

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

Fig. 3 is a sectional view of a pipe or the like wrapped with the covering of Fig. 1;

Fig. 4 is a fragmentary sectional view depicting a double ply covering wrapped about a pipe or similar object;

Fig. 5 is a diagrammatic end view taken through a portion of the covering, illustrating more in detail one form of the same;

Fig. 6 is a plan view of the construction of Fig. 5;

Fig. 7 is a view similar to Fig. 5, depicting another form of the blanket;

Fig. 8 is a plan view of the construction of Fig. 7;

Fig. 9 is a view similar to Fig. 5, showing a further modification;

Fig. 10 is a plan view of the modification of Fig. 9;

Fig. 11 is a diagrammatic end view of a multiply covering in accordance with the invention;

Fig. 12 is a bottom plan view of the covering of Fig. 11; and

Fig. 13 is a plan view showing a further feature of the invention.

Referring now to the drawings, and particularly to Figs. 1, 2, and 3, there is shown an insulating covering or blanket embodying the invention and comprising a plurality of elements 10, such as ropes or rovings. Elements 10 are preferably composed of asbestos fibres lying substantially longitudinally of the elements and parallel to one another in a relatively loose relationship, the elements having little or no twist. To impart sufficient strength to the elements 10 to enable them to withstand fabrication, and also to strengthen the completed blanket or covering, it may be desirable in some instances to reenforce the elements. This can be accomplished according to known practice in the art, for example, by incorporating a reenforcing cord 11, such as a wire-reenforced asbestos strand, in the center of the elements 10, or wrapping the elements with a reenforcing cord 13, or both. A plurality of the reenforcing wrapping cords may be employed if desired, in such event the cords preferably being wrapped in opposite directions about the elements 10.

The elements 10 are secured in parallel contiguous arrangement by means of cross strands 12 in a manner which will be hereinafter fully described. The strands 12 preferably constitute

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wire-reenforced asbestos, that is, asbestos fibres twisted around a fine wire of brass or the like. Where the covering is to be wrapped around a pipe or similar object, there may be provided an outer wrapping layer of fabric or the like 14 adhesively or otherwise secured to the covering. The layer 14 may suitably be impregnated or coated with a moisture-proofing composition.

Referring particularly to Fig. 3, a covering as described above is shown in position about a pipe, with elements 10 forming a continuous, relatively thick layer of the asbestos insulating material. Covering sheet 14, as referred to above, forms a wrapper extending over the insulating material, the sheet including a lapping flange 16 adhesively or otherwise secured to the overlapped portion and holding the covering in assembled position upon the pipe 18. The covering may be made of a multi-layer type if desired, as shown in Fig. 4.

Referring now particularly to Figs. 5 to 13, inclusive, several ways of securing the elements 10 in assembled relationship in accordance with the invention are depicted. It will be understood that the elements 10 are shown somewhat spaced from one another in the several figures only for the purposes of clarity of illustration and that in the actual covering they will be closely pressed together, embracing strands 12 where they extend therebetween. In each of the embodiments, a braiding operation is employed to fabricate the covering, elements 10 constituting cores around which are braided the strands 12. The braider employed may be of any suitable type to permit the passage through the braiding point of a plurality of the elements 10 lying substantially parallel to one another in the same plane to form a relatively wide blanket, say, one having a width of 2' or more.

In the embodiment of Figs. 5 and 6, the braiding carriers of the braiding machine are arranged to travel in paths to, in effect, wrap the strands 12 in a loose spiral around adjacent elements 10. Thus, as will be noted from an inspection of Figs. 5 and 6, the strands wrap successive pairs of the elements, one element of each pair also constituting one of the elements of the adjacent pair. Specifically, element 10*a* of pair 20 wrapped by strand 12*a* also constitutes an element of pair 22 wrapped by strand 12*b*, and element 10*b* constitutes one of the elements of pair 22 and also one of the elements of pair 24 wrapped by strand 12*c*, such sequence continuing throughout the width of the blanket.

The construction of Figs. 5 and 6, as described above, provides a covering that may be divided longitudinally at any point without loosening of the contiguous arrangement of the elements 10 or separation of the elements 10 adjacent the cut edges. Thus, for example, if the blanket shown in Fig. 6 is severed between elements 10*a* and 10*b* by cutting strand 12*b* where it crosses therebetween, the first pair of elements will be maintained in assembled relationship by strand 12*a* and the second pair of elements will be maintained in assembled relationship by strand 12*c*, the severing of the strand 12*b* in no way affecting the relationship between the elements 10 of either severed section of the covering.

Referring now particularly to Figs. 7 and 8, a modification is shown in which a small diameter, reenforcing, stuffer cord or element 30 is inserted between elements 10. Suitably, the cord 30 may be of wire-reenforced asbestos, similarly as strands 12. In the fabricating operation, the braiding strands 12 wrap around each element 10 and both adjacent stuffer cords 30. If the covering is cut longitudinally at any point, no more than one of the elements 10 can be released, the elements 10 and 30 in the remainder of the blanket maintaining their close association. This embodiment has the further advantage that the stuffer cords 30 serve, in effect, as hinges between elements 10, permitting the blanket to very readily be bent about a curved surface or to conform to other surface irregularities of the object to which it is applied.

The construction shown in Figs. 9 and 10 is similar to that of Figs. 5 and 6, except that the braiding strands 12 are crossed at 32 between adjacent elements 10. This is accomplished by having the braiding carriers travel in "figure 8" paths. An additional advantage is provided inasmuch as here again flexibility of the covering is promoted, whereby the same is readily adaptable to be applied to curved objects and those of irregular contour.

Referring now to Figs. 11 and 12, a specific construction for a multi-ply covering such as that of Fig. 4 is shown. Here the type of braiding employed is similar to that of Fig. 1, except that each braiding carrier wraps its thread around two of the elements 10 of one ply and one of the elements of the other ply, the elements lying in a substantially triangular arrangement and the bases of the triangles alternating between the upper and lower plies. Thus, elements 10*c*, 10*d*, and 10*e* are wrapped by strand 12*d*; elements 10*d*, 10*e*, and 10*f* are wrapped by strand 12*e*; elements 10*d*, 10*f*, and 10*g* are wrapped by strand 12*f*; and a similar sequence is followed throughout the width of the covering. In the event that the multi-ply blanket produced in this manner is divided longitudinally at any point by severing two or more of the strands 12, although certain of the elements adjacent the cut edge may be released, the divided portions of the covering will retain their compact form with the elements 10 thereof in closely contiguous relationship.

In each of the several forms of the constructions described above, the braiding strands 12 have been shown as being wrapped in only one direction around the elements 10. It will be understood, however, that without complication and where desired, an additional braiding strand 20 may be supplied for each set of adjacent elements, the latter strand being wrapped about the elements in the opposite direction, as illustrated, for example, in Fig. 13.

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

What we claim is:

1. A heat-insulating covering comprising a plurality of substantially parallel asbestos rovings and braiding strands maintaining said rovings in assembled relationship to form a blanket, said braiding strands securing each roving to an adjacent roving.

2. A heat-insulating covering comprising a plurality of substantially parallel rovings assembled in blanket form and strands maintaining said rovings in said assembly, said strands being wrapped in a loose spiral around pairs of adjacent rovings, with one roving of each said pair also constituting a roving of an adjacent pair.

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3. A heat-insulating covering comprising a plurality of substantially parallel and relatively large, soft, fibrous ropes assembled in blanket form, and strands wrapped in a loose spiral around adjacent ropes, said strands securing each rope to an adjacent rope independently of the other ropes.

4. A heat-insulating covering comprising a plurality of substantially parallel asbestos rovings assembled in blanket form and means comprising wire-reenforced asbestos strands holding said rovings in assembled relationship, said strands securing each of said rovings to contiguous rovings independently of the other rovings.

5. A heat-insulating covering comprising a plurality of relatively large, substantially parallel rovings assembled in blanket form and cords extending longitudinally thereof and interposed therebetween and strands wrapped about each of said rovings and its adjacent cords and securing said roving and cords in said assembly.

6. A heat-insulating covering comprising a plurality of parallel asbestos rovings assembled in blanket form and wire-reenforced asbestos cords extending longitudinally of said rovings and interposed therebetween and a plurality of wire-reenforced asbestos braiding strands securing said rovings and cords in said assembly, with a strand wrapped about each of said rovings and its adjacent cords.

7. A heat-insulating covering comprising a plurality of substantially parallel rovings assembled in blanket form and strands maintaining said rovings in said assembly, said strands being wrapped around pairs of adjacent rovings and crossing therebetween, with one roving of each pair also constituting a roving of an adjacent pair.

8. A heat-insulating covering comprising a plurality of substantially parallel asbestos rovings assembled in blanket form and wire-reenforced asbestos strands maintaining said rovings in said assembly, said strands being wrapped around pairs of adjacent rovings and crossing therebetween, with one roving of each said pair also constituting a roving of an adjacent pair.

9. A heat-insulating covering comprising a plurality of layers of substantially parallel rovings assembled to form a multi-ply blanket and strands securing said rovings in said assembly arranged to permit division of said covering between ropes with maintenance of the assembly in the divided portions.

10. A heat-insulating covering comprising a plurality of layers of substantially parallel rovings assembled to form a multi-ply blanket and strands securing said rovings in said assembly, each of said strands passing in a loose spiral around a roving of a layer and a plurality of rovings of an adjacent layer.

11. A heat-insulating covering comprising a plurality of layers of substantially parallel asbestos rovings assembled to form a multi-ply blanket, wire-reenforced asbestos strands securing said rovings in said assembly, said strands passing in a loose spiral around each roving of a layer and a plurality of rovings of an adjacent layer.

12. A heat-insulating covering comprising a plurality of substantially parallel rovings assembled in blanket form and strands maintaining said rovings in said assembly, a pair of said strands being wrapped in a loose spiral around pairs of adjacent rovings, with one roving of each said pair also constituting an element of an adjacent pair of rovings, said strands being wrapped in opposite directions.

13. A heat-insulating covering comprising a plurality of substantially parallel asbestos rovings, strands maintaining said rovings in said assembly, said strands being wrapped in a loose spiral around adjacent rovings and securing each roving in the assembly independently of the adjacent roving, and a fabric layer adhesively secured to one face of said assembly.

14. A heat-insulating covering comprising a plurality of substantially parallel ropes or rovings assembled in blanket form, each comprising a multiplicity of loose asbestos fibres and a reenforcing cord, and crossing strands maintaining said rovings in assembled relationship, said strands securing each of said rovings to an adjacent roving independently of the other rovings.

15. A heat-insulating covering comprising a plurality of substantially parallel ropes or rovings assembled in blanket form, each comprising a plurality of loose, longitudinally extending asbestos fibres and a reenforcing cord, strands maintaining said rovings in said assembly, said strands being wrapped in a loose spiral around adjacent rovings and securing each roving in the assembly independently of the adjacent roving.

16. A heat-insulating covering comprising a plurality of substantially parallel and relatively large, soft, fibrous ropes assembled in blanket form and cords of relatively small diameter extending longitudinally of said ropes and interposed therebetween, and strands wrapped in a loose spiral about each of said ropes and the cords adjacent thereto and securing said rope and cords in said assembly.

17. A heat-insulating covering comprising a plurality of layers of substantially parallel and relatively large, soft, fibrous ropes assembled to form a multi-ply blanket and strands securing said ropes in assembled relationship, each of said strands passing in a loose spiral around a rope of a layer and an adjacent pair of ropes of the other layer.

18. A heat-insulating covering comprising a plurality of substantially parallel elements including asbestos rovings, said elements being assembled in blanket form and strands maintaining said elements in said assembly, said strands being wrapped in a loose spiral around groups of adjacent elements, with an element of each group also constituting an element of an adjacent group.

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