

No. 685,780.

Patented Nov. 5, 1901.

R. H. MARTIN.  
NON-CONDUCTING COVERING.

(Application filed Mar. 7, 1900.)

(No Model.)

Fig. 1-

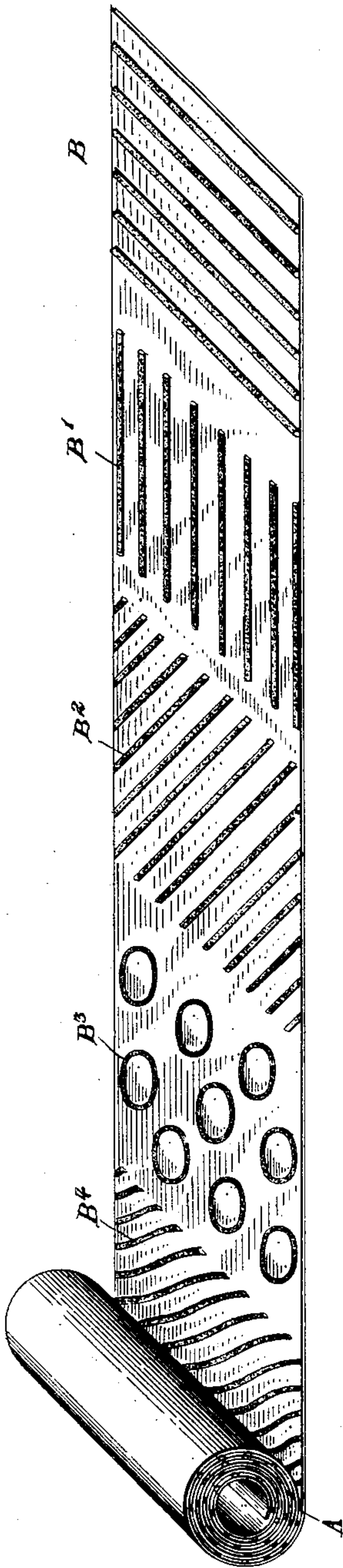


Fig. 2-

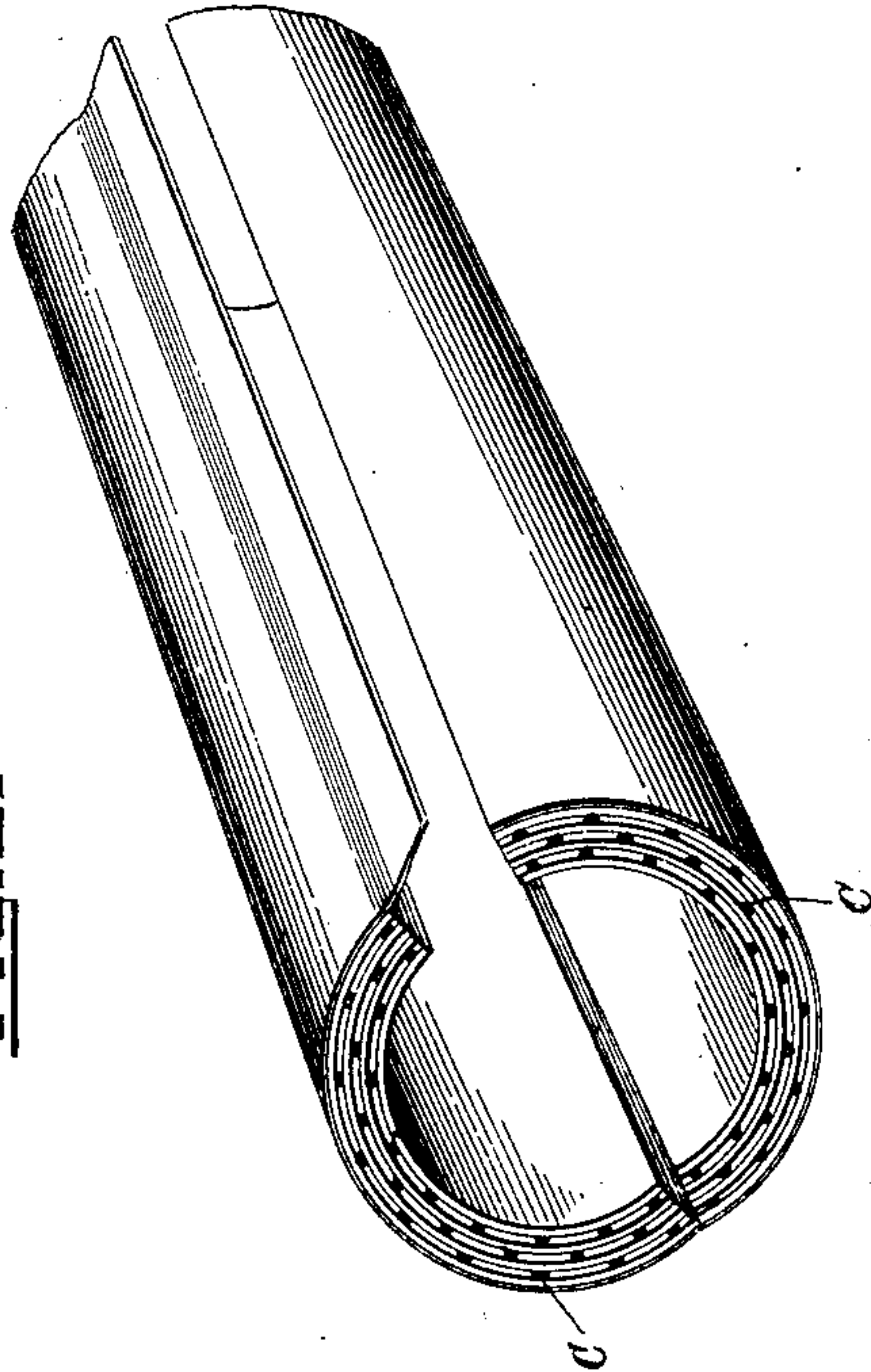
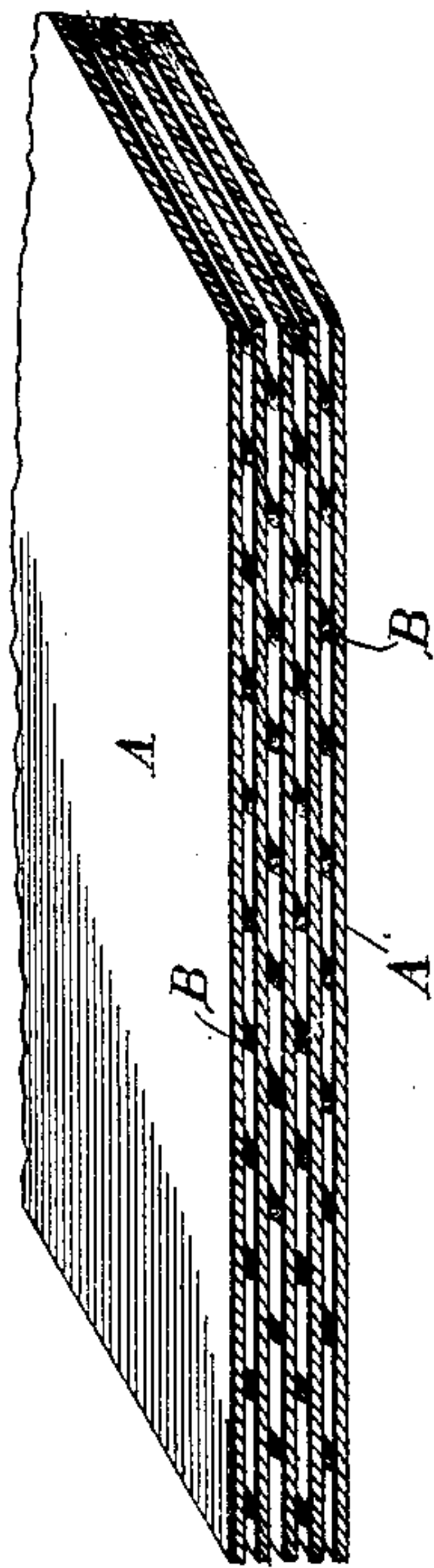


Fig. 3-



Witnesses

Geo. W. Mayday

William H. Snellina

Inventor  
Robert H. Martin.  
By his Attorney  
Phillips Abbott



# UNITED STATES PATENT OFFICE.

ROBERT H. MARTIN, OF NEW YORK, N. Y.

## NON-CONDUCTING COVERING.

SPECIFICATION forming part of Letters Patent No. 685,780, dated November 5, 1901.

Application filed March 7, 1900. Serial No. 7,631. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT H. MARTIN, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, (having my post-office address at No. 354 West One Hundred and Twenty-second street,) have invented a new and useful Improvement in Non-Conducting Coverings, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 illustrates a perspective view of a roll of the material, one end of which is extended, and upon it in different sections are illustrated some of the forms in which the invention may be produced. Fig. 2 illustrates a vertical sectional view, somewhat enlarged as compared with Fig. 1, showing in perspective one form of a slab or covering embodying my invention adapted for application to a flat surface. Fig. 3 illustrates in perspective a portion of a section of pipe-covering embodying the invention.

Coverings made under my invention may be either "fireproof," so called, adapted to be used upon heated surfaces, or non-fireproof, adapted to be used for insulating cold surfaces or those not so heated as to require fireproof covering. In them both the characteristic feature of confined or non-circulating air-spaces is present—that is to say, spaces in which the free circulation of the air is so retarded as to constitute them what are known in this art as "dead-air" spaces. The degree of confinement of the air will depend upon the special formation of the raised ribs, but in all forms the abutment of the several sections or sheets of the covering against each other when in place upon the surface to be covered will, in effect, so retard the circulation of the air that the purpose of the construction will be accomplished, as is well known in this art.

To make the fireproof covering, I take a sheet of asbestos paper or equivalent non-inflammable sheet or layer and on one or both of its surfaces I deposit in strips, lines, or bands any suitable adhesive material—such as paste, silicate of soda, glue, or the like—which is preferably applied in liquid condition. In some instances where the paper or other sheet has been sufficiently sized the

application of moisture only in strips, lines, or bands will suffice, because it will soften the size, thus rendering it adhesive, and it will thus take the place of the adhesive material applied as above. In some cases a sheet which has been heavily sized during its manufacture may be sprinkled with water or moistened in it and then the fibrous material applied in strips or bands upon it. On these bands, strips, or lines of adhesive material, however produced, while still moist and adhesive, I next deposit finely-divided asbestos material in soft, flocculent, and non-fabricated condition, such as very short fiber, floor-sweepings, and the like, which are of low grade and of but little value. This material adheres to the bands, strips, or lines of adhesive substance, forming raised ribs or ridges having the pattern or arrangement of the adhesive material on the sheet. The height of these ribs above the plane of the sheet and their density will depend upon the character of the material used, the amount of it that is applied, and the character of the adhesive material. The non-fabricated material thus applied need not necessarily be fibrous. It may be granular. The sheet, having the ribs or ridges upon it, is then dried and used to make various forms of non-conducting and fireproof covering for pipes, boilers, tanks, &c. For flat covering a series of these sheets or layers may be superposed one upon the other in such manner that the smooth or non-ribbed side of the sheet will rest upon the ribs or ridges of the sheet below until the requisite number of sheets have been superposed to build up the desired thickness of covering. Any other arrangement of the sheets or layers may, however, be employed, and they may be united together, if desired, into an integral structure by applying adhesive material to the tops of the ridges or ribs or to the under side of the superposed sheet, as the case may be, or they may be attached by stapling, sewing, or in any other preferred manner, and this method of attachment may extend uniformly throughout the superposed layers, or at the edges or corners only, or here and there at intervals throughout the area of the covering, as desired.

For making so-called "sectional" or "tu-



bular" covering for pipes I prefer to make the ribbed sheets in long lengths and then to roll them upon a mandrel, as usual in such manufactures, until the requisite number of  
 5 layers be superposed one upon the other; and they may be connected together in either of the ways above explained, or in any other preferred manner. The tube thus formed  
 10 may be sawed or otherwise split open at one side or at both sides, and provided with an exterior covering, which shall act as a hinge, if desired, or otherwise finished.

For making covering that is not fireproof, suitable for use in cold-storage warehouses  
 15 and other places where considerable heat will not be encountered, I frequently employ a sheet which is not fireproof—as, for instance, a sheet of ordinary paper, felt, or equivalent material—and apply to it or pro-  
 20 duce upon it the lines, strips, or bands of adhesive substance, and then apply upon these adhesive strips, lines, or bands the finely-divided or short fibrous material—such as shoddy or equivalent substance, preferably  
 25 of low cost, all as above stated.

In order to give the proper finish to the exterior of the covering, whether fireproof or not, I prefer that the last or outer sheet shall be plain paper, so as to present a smooth sur-  
 30 face which may be painted or otherwise decorated, and it should be preferably a relatively tough material, so as to withstand abrasion in use. A canvas, muslin, or burlap covering may also be employed.

35 Referring now to the drawings, in Fig. 1 are shown various forms in which the adhesive material may be applied to or produced upon the surface of the sheet.

A illustrates the sheet, and B the ridges of  
 40 fiber running transversely of the sheet. At the right at B' the ridges are shown running longitudinally, at B<sup>2</sup> they run diagonally across it, at B<sup>3</sup> they are in circular form, the circles being arranged irregularly, (they may be of dif-  
 45 ferent size also,) and at B<sup>4</sup> the ridges are shown serpentine in shape. If the bands, strips, or lines of adhesive material and the resulting ridges or ribs run at right angles to the length of the sheet, then when it is coiled up into  
 50 sectional covering, as shown in Fig. 3, the ridges C will run longitudinally of such sectional covering, as shown in that figure. If, on the other hand, the ridges run longitudi-  
 55 nally of the web of the sheet, then when it is coiled into sectional covering they will run circumferentially around it, and if they are arranged diagonally or are circular, or ser-  
 60 pentine, or square, whatever the pattern may be, then the disposition of the ridges, and consequently the shape and degree of isolation of the confined air-spaces, will correspondingly differ.

In Fig. 2 I show four layers or sheets only superposed one upon the other, A being the  
 65 base-sheet, and B the ridges. In this example the strips of adhesive material and the re-

sulting ridges or ribs have run either straight across the original web or longitudinally thereof, depending upon the way in which the original web has been cut to make the flat 70 covering illustrated in this figure.

I wish it to be understood that I am fully aware that for certain purposes it is preferable to have the ridges run in one direction and for other purposes in other directions. 75 I have therefore illustrated in Fig. 1 various forms in which they may be arranged. Indeed, the pattern adopted may be such as preferred. The forms shown are given as ex-  
 80 amples only. I am also well aware that in some of the forms shown the confinement of the air will be more complete than in others; but in them all there is retardation of the circulation of the air. Also I do not limit my-  
 85 self to the superposition of four sheets only, as shown in Fig. 2, or to the special construction of sectional covering, as shown in Fig. 3. They are given as examples only.

I make coverings both sectional and flat, partly of fireproof and partly of non-fireproof 90 material—as, for instance, covering may be made of one or more sheets of asbestos, having finely-divided asbestos to form the ribs or ridges next to the heated surface, and then the requisite thickness of the covering may 95 be supplied by adding other sheets of non-fireproof material, ribbed or not. In making up the covering plain sheets may be interspersed with the ribbed sheets, and the ribs or ridges may be made of such size as pre- 100 ferred, but always of the non-fabricated material.

When in the claims hereof I describe the material which constitutes the ridges or ribs as "non-fabricated," I do so to distinguish the 105 material I use from that which has been made up into a product, such as a sheet or a rope or similar article, for the purpose of my invention is, among other things, to economize in the manufacture of the covering and to util- 110 ize low-grade material or that which is, in a sense at least, waste product, although in many instances usable for other purposes.

A feature of my invention is the fact that the ribs or ridges as made by me being of loose, 115 flocculent, non-compressed material are better non-conductors of heat than if compacted more or less by having been made into a finished product, such as a sheet or cord. Other advantages arising from this invention as 120 compared with other forms of covering in which the dead-air spaces are made by using corrugated or similar sheets are as follows: My covering embodies a much less amount of high-priced material—that is to say, the 125 asbestos or other finished sheets. Moreover, the efficiency in my covering is rather greater than in the more expensive forms, because of the non-conducting quality of the flocculent and loose ribs as compared with the more 130 compacted material, as above stated. Also my coverings are somewhat lighter in weight



than those of equal efficiency heretofore made. Also where corrugated or indented sheets are employed for making the air-spaces they almost invariably after the lapse of time  
5 lose their corrugations or indentations, becoming soft, flabby, and misshapen, particularly where subjected to dampness.

Having described my invention, I claim—

10 1. A non-conducting covering embodying superposed sheets or layers of material having ridges of non-fabricated and finely-divided material between and attached to them, for the purposes set forth.

15 2. As a new article of manufacture, a sheet of material having ridges of non-fabricated and finely-divided material attached to its surface, for the purposes set forth.

20 3. A non-conducting covering embodying a plurality of layers or sheets of material having ridges of non-fabricated and finely-divided material permanently attached to them, whereby they are separated from each other,

and an exterior jacket or covering, for the purposes set forth.

4. A fireproof non-conducting covering com- 25  
posed in part of an inner sheet of asbestos material and ridges of non-fabricated asbestos fiber attached to said asbestos sheet and interposed between it and the next adjoining sheet or layer, for the purposes set forth. 30

5. A fireproof non-conducting covering embodying superposed sheets or layers of asbestos material having ridges of non-fabricated asbestos fiber permanently attached to them, whereby they are separated, and an exterior 35  
jacket or layer, for the purposes set forth.

Signed at New York, in the county of New York and State of New York, this 27th day of February, 1900.

ROBERT H. MARTIN.

Witnesses:

H. S. WHITBECK,  
PHILLIPS ABBOTT.