Jan. 20, 1925. 1,523,702

W. J. MOELLER ET AL

INSULATING MATERIAL

Filed March 3, 1922

Fig. 1.

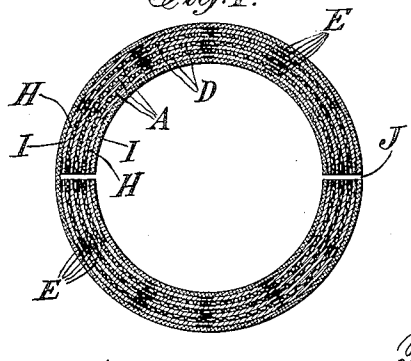


Fig. 2.

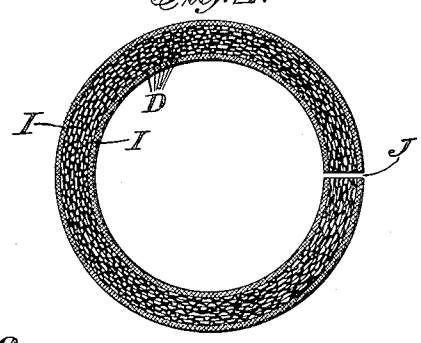


Fig. 3.



Fig. 4.

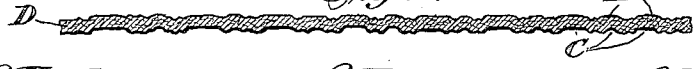


Fig. 5.

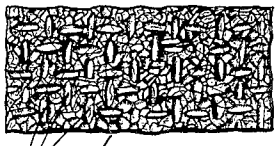


Fig. 6.

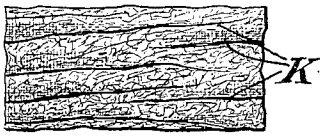


Fig. 7.



Fig. 8.

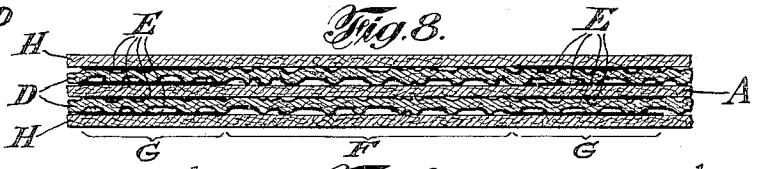


Fig. 9.

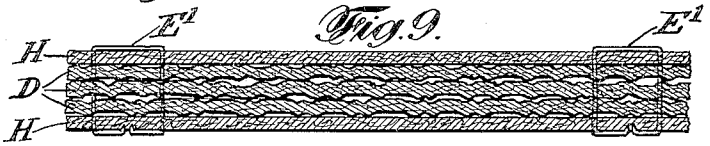
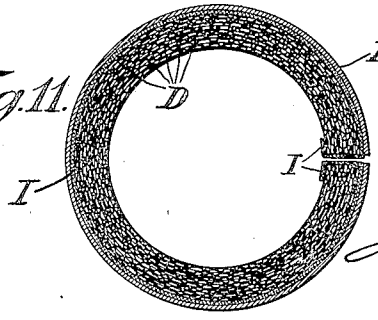


Fig. 10.



Fig. 11.



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Patented Jan. 20, 1925. 1,523,702

UNITED STATES PATENT OFFICE.

WILLIAM J. MOELLER AND HENRY J. KABBES, OF WYOMING, OHIO.

INSULATING MATERIAL.

Application filed March 3, 1922. Serial No. 540,878.

To all whom it may concern:

Be it known that we, WILLIAM J. MOELLER and HENRY J. KABBES, citizens of the United States, and residents of Wyoming, in the county of Hamilton, State of Ohio, whose post-office addresses are Wyoming, Ohio, have invented new and useful Improvements in Insulating Materials, of which the following is a specification.

Our invention relates to heat insulating materials.

In the drawings Fig. 1 is a cross section of a pipe covering embodying our invention.

Fig. 2 is a modification thereof.

Figs. 3 and 4 are cross sections of paper used in manufacture of our covering.

Fig. 5 is a plan view of the under side of Fig. 4.

Figures 6 and 7 are plan views of opposite surfaces of Fig. 3.

Figures 8 and 9 are insulating blocks embodying our invention.

Fig. 10 is an insulating block embodying a modification thereof.

Fig. 11 is a modification of our invention.

In the drawings, in which like letters refer to like parts A is a sheet or ply of suitable material, such as asbestos paper, which in the manufacture thereof has been made so that one surface is crêped, crinkled or provided with innumerable flexures or elevations or ridges K of varying heights and the opposite surface with innumerable small indentations L. Such crêping or crinkling and indenting of the paper surface permits the paper to be readily indented or embossed without breaking the same. The paper A, we prefer to treat with a surface sizing of, or to saturate it with, a suitable material such as silicate of soda which tends to stiffen the sheet. The sheet or ply A of asbestos paper, is embossed as at B, B in any suitable manner forming the embossed sheet D. We have found that by passing it between two rolls, one of which is provided with a yielding surface, such as rubber or felt, while the other roll is provided with nonyielding projections, the sheet A is embossed or indented. The embossed projections B or indentations C may be of any configuration but a highly satisfactory insulating material may be manufactured by having the projections B or indentations C irregularly arranged. In Fig. 5 we have some of embossed projections as long and narrow and arranged parallel, the adjacent intermediate ones being at right angles thereto. The crinkled indented sheets so embossed are readily made without breaking due to the greater amount of paper between projections to carry the strain and permit of the necessary stretching in any direction.

Our improved insulating material may consist of one ply, or of a plurality of plies, of the embossed paper D depending upon the thickness of material desired. In one form of our invention shown in Figures 1 and 8 we have shown a plurality of embossed asbestos plies D separated by asbestos sheets A which may be plain surfaced if desired, and held together by suitable adhesive E such as silicate of soda. Preferably we arrange the adhesive so that there are intervening spaces where the sheets A and D are not held in engagement. By this arrangement of the adhesive as shown in Figure 8 the finished material is built up so that it has areas G which are comparatively solid and other cushion like areas F. The adhesive may be arranged so as to form the comparatively solid areas G, either in lines to encircle the pipe, or lines longitudinally of the pipe or in a number of disconnected areas which could be obtained by spotting the adhesive.

Our improved insulating material is composed of an innumerable number of cells for entrapping air, having sufficient rigidity to hold it in desired form and flexible enough to permit its ready application.

In Figure 9 we have shown a modification in which is assembled a plurality of embossed asbestos plies D without any intervening sheets. In Figure 9 we have also shown a modification of the means for attaching the plies together consisting of staples or wire stitches E′. Either adhesive E or stitches E′ may be used for attaching the various plies of our insulating material together.

In Figure 10 we have shown a form of covering made of a number of plies A of crinkled or crêped surfaced asbestos paper without any embossing.

In some forms of our invention we provide on the exterior of the insulating material protective or liner sheets H of asbestos paper or other suitable material which may be either plain or crêped or crinkled sheets A. We preferably make the liner H, which is

to come into contact with the surface being insulated, of a relatively heavy and plain asbestos paper. In making cylindrical pipe covering we prefer to surround the material with a jacket of suitable woven material such as canvas, etc. As shown in Fig. 1 the pipe covering is formed of two sections attached by canvas cover I or other suitable material which acts as a hinge. In Fig. 2 the cylindrical covering is separated longitudinally at J so as to be sprung apart and placed about a pipe.

In Figure 11 we have shown a modification of our heat insulating unit for cylindrical surfaces made of a number of plies D covered with canvas or linen I which passes around the edges and is cemented as shown on the inner side; thereby forming edges adapted to be brought together or if desired they may be beveled to overlap. This modification is especially adapted to be used on hot water tangs, etc., and is held in place by metal bands M encircling same.

By the use of crêped or crinkled indented paper which we emboss we have found a lighter weigth paper can be used than heretofore which greatly reduces the weight of the insulating material while at the same time increasing its nonheat conducting qualities.

Claims:

1. An insulating material composed of a plurality of embossed plies of sheet material, said sheet material having independent of said embossing an irregular uneven surface on one side and a non-corresponding uneven surface on the opposite side.

2. An insulating material composed of a plurality of plies of embossed sheets, each of said sheets having a plurality of embossed portions of greater length than breadth each of said portions arranged at an angle to the next adjacent portion.

3. A cylindrically formed insulating material composed of a plurality of plies of embossed sheets, each of said sheets having a plurality of embossing portions of greater length than breadth each of said portions aranged at an angle to the next adjacent portion, and a cementing material arranged to form bands at intervals to cement said plies together.

4. An insulating element formed of a plurality of plies of mineral paper having irregular ridges on one surface and non-conforming indentations on the opposite face thereof.

5. An insulating element formed of a plurality of plies of embossed mineral paper having independently of said embossing irregular ridges on one surface and indentations on the opposite face thereof, and spaced apart means for holding same together.

6. An insulating element formed of a plurality of plies of asbestos paper having irregular ridges on one surface and non-conforming indentations on the opposite face thereof, an outer cover for said element passing around an edge thereof and affixed to the under side thereof.

In testimony whereof, we have signed our names to this specification.

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HENRY J. KABBES.