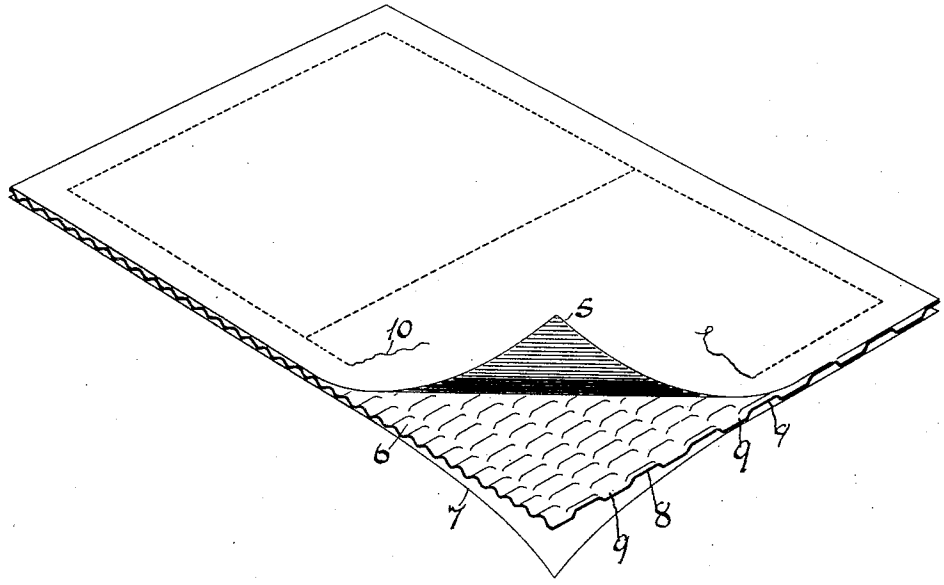
No. 784,831. PATENTED MAR. 14, 1905.

C. S. BIRD.

INSULATING SHEET OR STRUCTURE.

APPLICATION FILED MAY 31, 1904.



Witnesses:

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No. 784,831. Patented March 14, 1905.

UNITED STATES PATENT OFFICE.

CHARLES S. BIRD, OF EAST WALPOLE, MASSACHUSETTS.

INSULATING SHEET OR STRUCTURE.

SPECIFICATION forming part of Letters Patent No. 784,831, dated March 14, 1905.

Application filed May 31, 1904. Serial No. 210,423.

To all whom it may concern:

Be it known that I, CHARLES S. BIRD, of East Walpole, in the county of Norfolk and State of Massachusetts, have invented a new and useful Improvement in Insulating Sheets or Structures; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification.

This invention relates to improvements in insulating sheets or structures adapted for use in buildings, refrigerators, or other constructions and designed to retard the passage of heat.

The main object of the invention is to provide a novel insulating sheet or structure designed to resist undue changes of temperature in the construction in which the sheet is incorporated.

Another object of the invention is to provide a sheet of this nature designed to form a multiplicity of air-cells and to protect the material forming the air-cells from moisture, while permitting the rolling of the sheet without undue crimping of the layers.

Other objects of the invention will appear from the following description and by reference to the drawing.

The invention consists in a flexible sheet having a multiplicity of air-compartments and a flexible protecting-sheet loosely attached to the air-compartment sheet to permit of limited independent movement of the sheets in rolling the same.

The invention also consists in a flexible sheet having a series of air-compartments at both sides thereof and flexible moisture-excluding sheets between which the air-compartments are located, said sheets being loosely secured together by sewing, whereby the complete article may be rolled upon itself without unduly crimping either of the sheets.

The invention also consists in the construction of the improved insulating sheet or structure.

The drawing represents a perspective view of the improved sheet or structure, parts of the outer layer being turned back to disclose the preferred form of the intermediate layer or air-compartment sheet.

Insulating-sheets of this general nature are preferably formed of a sheet of flexible fibrous material, such as paper-stock, embossed to provide a series of projections at each side of the sheet, which when the insulating-sheet is incorporated in a building structure form a multiplicity of air cells or compartments, whereby layers of air are designed to be retained in position to prevent undue or rapid changes of temperature within the building by retarding the passage of heat or cold.

As the maintaining of air-compartments in compound structures results in the condensation of moisture therein by the difference in temperatures within and without the structure, one of the objects of this invention is to protect the air-cell sheet from such condensation and at the same time to provide such air-cell sheet and protecting coverings as a unitary article convenient for shipping and designed for ready application.

As shown in the drawing, in its preferred form the improved insulating-sheet is formed of a series of flexible layers 5, 6, and 7, attached together by sewing. The intermediate layer 6 is preferably formed of comparatively coarse paper-stock and is embossed to form at both surfaces a series of rows of projections 8 8, alternating with corresponding depressions 9 9, which form corresponding projections at the opposite side of the sheet, the projections 8 8 of each of the rows being staggered with regard to those of the adjacent rows. This sheet 6 may be or may not be treated with fireproofing, waterproofing, or other compound of a preservative nature. The outer layers 5 and 7 are preferably formed of paper-stock treated in any usual manner with waterproofing or other moisture resisting or preservative compound, and these layers 5 and 7 are secured to the intermediate layer 6 by means of stitches of thread 10 or by other equivalent means.

By the attachment of the layers 5, 6, and 7 together a unitary article is formed which is convenient for shipping purposes and is ready for application as a lining or insulating layer

in any compound structure, while the layers 5 and 7 will receive any moisture on their exterior surfaces and prevent the passage of the moisture to the air-cell sheet, thus protecting the air-cell sheet from the absorption of moisture and the resultant loss of shape and flattening out of its projections, the attachment of the air-cell sheet to the outer layers also acting to mechanically sustain the air-cell sheet in the desired position relatively to the outer layers.

It is obvious that for some uses but one side of the air-cell sheet need be protected, and therefore I do not intend to limit myself to the use of both of the layers 5 and 7, nor do I desire to limit myself to the particular shape and arrangement of the projections 8 8, as other shapes and arrangements of equivalent means for securing a large number of air-cells may be utilized.

The several layers forming the compound sheet may be secured together continuously near the edge, as shown, or they may be attached together at a series of separated points and other means than sewing may be used for this purpose; but it is important that these sheets or layers should be so loosely secured together that the compound sheet may be rolled together for shipping or storage without effecting the undue crimping of any of the sheets, it being extremely difficult to flatten the sheets out when the crimps are formed and set by being held for a length of time in the crimped position.

The term "waterproof" is used in the claims as designating material which is substantially waterproof under ordinary conditions of use.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. An insulating-sheet comprising a flexible sheet having a multiplicity of projections formed at one surface thereof, and a flexible protecting waterproofed sheet loosely secured to said first-named sheet whereby a limited independent movement of the sheets may be effected in rolling.

2. An insulating-sheet comprising an intermediate sheet having series of projections arranged in rows at both sides thereof, the projections of each row being staggered with relation to the projections of the adjacent rows, and a pair of outer flexible waterproof layers loosely secured to the intermediate sheet by sewing.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES S. BIRD.

Witnesses:

HENRY J. MILLER,

WM. K. CHURCHILL.