The invention relates to new and useful improvements in a door for commercial refrigeration systems.

An object of the invention is to provide a door of the above type wherein a temperature insulating material having a shape conforming to the dimensions of the door is completely housed in a thermo-set plastic composition forming the exterior surface of the finished door.

A further object of the invention is to provide a plastic door of the above type wherein the shaped temperature insulating material is completely enclosed in an envelope of permeable material which envelope is covered and impregnated with a thermo-set plastic composition forming the exterior surface of the finished door.

A further object of the invention is to provide a novel method of making a plastic door of the above type consisting in shaping a mass of temperature insulating material to conform substantially to the dimensions of the door to be produced, completely enclosing said shaped mass in an envelope of permeable material, coating and impregnating said envelope with a thermo-setting plastic composition, placing the coated impregnated envelope and enclosed insulating material in a mold and subjecting the same to pressure at a temperature and for a time sufficient to cure or harden the plastic composition and produce a rigid finished door.

In the drawings, which show, by way of illustration, one embodiment of the invention in a door for commercial refrigeration systems and the method of making the same:

Figure 1 shows more or less diagrammatically the front view of a door mounted in a door frame, the front of the door being broken away to show the arrangement of the strips of insulating material.

Figure 2 is a sectional view on the line 2-2 of Figure 1.

Figure 3 is a sectional view on the line 3-3 of Figure 1.

Figure 4 is an enlarged sectional view through a portion of the door and the door frame showing the reinforcement for the door fastener.

Figure 5 is an enlarged vertical sectional view through the upper portion of the door and the lower portion of the door.

Figure 6 is a perspective view of several of the strips showing their overlapping relation in the assembly.

The invention is directed to a door for commercial refrigeration systems. The essential elements of the door structure are a mass of temperature insulating material having substantially the shape and dimensions of the door, an envelope of permeable flexible material completely and snugly enclosing the mass and a thermo-set plastic composition covering and impregnating said envelope and connecting adherently to the surface of the mass and constituting with the envelope a mass a rigid finished door.

The mass may be of fiber glass, granular cork or any other suitable temperature insulating material. It is essential that the mass shall be of substantially the shape and dimensions of the door. The envelope of permeable flexible material may be of fiber glass or any other permeable material which can be wrapped about the mass of insulating material to form an envelope completely and snugly enclosing the mass. The thermo-set plastic composition may be of any suitable type which is initially in a flowable condition so that it can be sprayed onto the envelope or otherwise applied so as to build up a covering of the desired thickness and so as to impregnate the envelope and adherently connect the same to the mass.

This thermo-setting plastic composition when cured forms with the temperature insulating mass, the impregnated envelope and coating on the exterior thereof, a rigid finished door.

The essential steps in the method of making the novel plastic door consists in forming a mass of temperature insulating material which mass conforms in shape and dimensions to the door to be produced, wrapping about the mass a mat of permeable material to form an envelope completely and snugly enclosing the insulating material, coating and impregnating the entire envelope with a thermo-setting plastic composition, placing the coated and impregnated envelope together with the enclosed mass of insulating material in a mold and subjecting the same to pressure at a temperature and for a time sufficient to cure or harden the plastic composition and produce a rigid finished door.

In the drawings there has been illustrated one form of plastic door and the manner of making the same and a detailed description thereof will be given.

In Figure 1 there is shown a plastic door 1, mounted in a door frame 2 of any desired construction. The door is mounted on hinges 3,3 and is held closed by fasteners 4,4. There is also shown a hand lever device 5 to aid in opening the door. The door is sealed when closed by gaskets 6,6. These accessories are of the usual construction and form no part of the present invention.

The door frame 2 may be of any desired material and construction. The specific embodiment of the invention resides wholly in the door and the method of making the same.

The mass of insulating material is indicated at 7. It consists of strips 8 cut transversely from a sheet preferably of fiber glass, which strips are of a width substantially equal to the thickness of the finished door. These strips are placed side by side in staggered relation with the cut faces of the strips lying at the front and rear sides of the door so that the grain of the fiber glass extends transversely of the door, thereby giving strength to the door. When the assembly of strips is complete a mass is formed which conforms substantially in shape and dimensions of the door to be produced. While fiber glass is preferred, any suitable temperature insulating material of sheet formation may be used in forming the strips.

As above noted the insulating material instead of being in the form of strips may be in block form. It is essential, however, that the mass shall be shaped to conform to the dimensions of the door to be reproduced.

This assembly is then wrapped in a mat of permeable material so as to form an envelope 9 completely and snugly enclosing the assembly of strips 8. The mat may be of any suitable permeable material, for example, sheets of fiber glass are particularly adapted for this purpose as they are easily impregnated by a plastic composition while in flowable form.

The entire outer surface of the envelope is then coated with a thermo-setting plastic composition. The composition may be sprayed on the surface of the envelope or coated thereon in any suitable way. Sufficient composition is applied to thoroughly impregnate the envelope and build up thereon a coating 12 on the outer surface of the envelope of the desired thickness. The plastic composition not only impregnates the envelope but ex-
tends therethrough and adheres to the shaped mass of insulating material.

If desired, a coating of thermo-setting plastic may be applied to the mass before it is wrapped in the mat in order to insure a firm bonding of the envelope to the mass of insulating material when the plastic is set or cured.

The thermo-setting plastic composition preferably includes a polyester resin base although other types of thermo-setting plastics may be used. The coated and impregnated envelope with its inclosed temperature insulating material is then placed in a mold. The mold may be of any well-known type. It is essential that the mold completely house and contact with the ends, sides, top and bottom of the coated envelope. Also, so that pressure and heat may be applied to the enclosed assembly for giving a final shape thereto and for curing or hardening the thermo-setting plastic composition. This completes the finished door ready for attachment of the desired accessories. In order to provide a firm attachment for accessories a back-up board, preferably of plywood 11 is placed between the envelope and the insulating material in the area where the accessories are to be attached. This is done during the wrapping of the assembly to form the envelope. The finished door comprises a mass of temperature insulating material shaped to conform to the dimensions of the desired door and an envelope completely and snugly enclosing the mass which envelope is coated and impregnated with a thermo-set plastic forming the entire outer surface of the door.

The door described above may be referred to as a plastic door as it is the hard thermo-set plastic that gives rigidity to the door and forms the finished surface thereof. Although the door may be of large dimensions to satisfy the requirements of commercial refrigeration systems, it is very light and does not shrink or expand under any condition of use.

The invention is illustrated as embodied in an overlap type of door. It is, however, equally applicable to the inset type of door. It is to be understood that many changes may be made in the specific illustrated form without departing from the spirit of the invention as set forth in the appended claims.

I claim:

1. A refrigerator door comprising a mass of temperature insulating material having substantially the shape and dimensions of the door, an envelope of permeable flexible material completely and snugly enclosing said mass, a thermoset plastic composition impregnating said envelope and bonding said envelope to said mass, and an outer covering of thermoset plastic composition integrally connected with the impregnated envelope and completely enclosing the same, said thermoset composition being cured under heat and pressure to provide a rigid finished door.

2. A refrigerator door comprising a mass of blocks of fiber glass disposed so that the grain of the fiber glass extends transversely of the door, said mass having substantially the shape and dimensions of the door, an envelope of permeable flexible material completely and snugly enclosing said mass, a thermoset plastic composition impregnating said envelope and bonding said envelope to said mass, and an outer covering of thermoset plastic composition integrally connected with the impregnated envelope and completely enclosing the same, said thermoset composition being cured under heat and pressure to provide a rigid finished door.

3. The method of making a door for refrigerator use comprising forming a mass of insulating material shaped to conform substantially to the dimensions of the door, wrapping about said mass a mat of permeable material to form an envelope completely and snugly enclosing the insulating material, impregnating the entire envelope and the surface portion of the mass with a thermoset plastic composition, forming an outer coating of thermosetting composition completely enclosing the envelope and placing the coated impregnated envelope in a mold and subjecting the same to pressure at a temperature and for a time sufficient to cure the plastic composition and produce a rigid finished door.

References Cited in the file of this patent

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Patent Number</th>
<th>Date</th>
<th>Inventor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,753,952</td>
<td>Apr. 8, 1930</td>
<td>Spreen</td>
</tr>
<tr>
<td>2,020,044</td>
<td>Nov. 5, 1935</td>
<td>Tesek</td>
</tr>
<tr>
<td>2,033,884</td>
<td>Mar. 10, 1936</td>
<td>Davison</td>
</tr>
<tr>
<td>2,393,947</td>
<td>Jan. 29, 1946</td>
<td>Ximenez</td>
</tr>
<tr>
<td>2,484,141</td>
<td>Oct. 11, 1949</td>
<td>Alex</td>
</tr>
</tbody>
</table>