

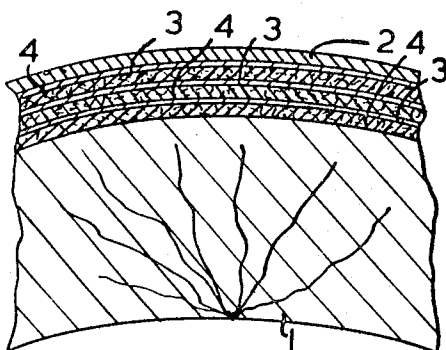
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PRESS BENDING MOLD WITH HEAT REFLECTIVE SURFACE

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PRESS BENDING MOLD WITH HEAT REFLECTIVE SURFACE

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The present invention relates to improvements in press bending molds utilized for imparting a desired curvature to glass sheets. Such molds comprise complementary male and female molding members. The glass sheet is bent by supporting it in a given position preferably while oriented vertically, heating it to a temperature at which it is capable of being deformed, supporting it between the complementary molding members and then bringing the molding members together to deform the sheet to the desired curvature.

In press bending methods of the prior art, use has been made of wooden molds covered with cloth formed of mineral fibers. Fibre glass cloth has been found to be a particularly useful covering material. Such press bending molds have, in general, been satisfactory when operating at relatively low production rates which give the wooden block a chance to cool between individual pressing operations. Thus, for example, it has been possible to operate without much difficulty at a production rate of one pressing operation per seven minutes or so. However, when the production rate is increased, for example up to one pressing operation per minute, the heat load on the wooden block is much higher and the wooden block begins to suffer. The difficulties become extreme when the production rate is increased to as high as three or four pressing operations per minute. It is then found that the blocks soon tend to suffer loss of form because of warping, splitting or burning under the heavy heat load which is applied to them.

One attempt at solving this problem has been to use metal blocks rather than wooden blocks. However, this is also not an entirely satisfactory answer to the problem. Metal blocks are more expensive than wooden blocks. If aluminum is used, there is a tendency for loss of form because of the high thermal expansion of aluminum. If cast iron is used, loss of form is less of a problem but difficulty is then often encountered because the cast iron blocks exert an undue chilling effect on the glass. To counteract this, it has been suggested to use heating coils within the metal blocks. This is, of course, an even more expensive expedient.

Another approach has been to replace the wooden blocks by blocks formed of an epoxy resin having a fibrous glass reinforcement. Such blocks are, however, quite expensive. Also, it has been found that the heat to which the blocks are exposed during a press bending operation is capable of causing blistering of an epoxy resin, glass fiber block after the block has been in use for some time.

It is an object of the present invention to provide a molding member for use in a press bending operation which comprises a wooden base member carrying a glass-contacting layer of mineral fibers but which is more durable in use than the prior art pressing members of this general type.

The invention provides a molding member for use in a press bending operation comprising a wooden block, an outer glass-contacting layer of mineral fibers and, sandwiched between said block and said glass-contacting layer, at least one layer of a heat-reflective metal foil and at least one layer of thermally insulating heat-resistant mineral fibers.

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The wooden block is of the same type as that used in the prior art, namely, one having a glass shaping surface shaped to conform to the shape it is to impart to the glass sheet surface that it engages during a press bending operation. The glass-contacting layer may, for example, be of glass fibers or asbestos fibers; a layer of knitted fibrous glass is especially satisfactory.

The heat-reflective foil is preferably aluminum foil although any other type of heat-reflective metallic foil can be used provided that it does not melt at the temperatures to which it is exposed in the glass bending operation.

The layer of thermally insulating heat-resistant fibrous material may be a layer of woven glass fibers but could also be of asbestos fibers or any other type of fibers such as felted layers which would stand up to the temperatures encountered. Knitted layers are superior to woven or felted layers.

Although in its broadest aspect the invention contemplates using at least one heat-reflective foil layer and at least one layer of thermally insulating heat-resistant fibrous material, it is preferred that a multiplicity of such layers should be used. The number of layers to use in a particular case is a matter for experiment but it has in practice been found that by employing three layers of heat-reflective metallic foil alternating with three layers of thermally insulating heat-resistant fibrous material very satisfactory results have been obtained in that the pressing life of a wooden block has been greatly prolonged over that which was obtained when the block was simply covered with a layer of knitted fibrous glass.

The invention will be described by way of illustration and without limitation with reference to the single figure of the accompanying drawing. This is a sectional view of a portion of a molding member according to the present invention, the scale having been somewhat distorted for purposes of clarity. The molding member of which a portion is illustrated in the accompanying drawing comprises a shaped wooden block 1 provided with an outer glass-cloth contacting layer 2 made of knitted fibrous glass. Between the block 1 and the glass-contacting layer 2 there are sandwiched three layers of aluminum foil 3 and three layers of woven glass cloth 4, the layers of foil and of cloth alternating with one another.

When using a molding member of this type in a press bending operation, the life of the molding member was considerably longer than that of a similar molding member which did not include the three layers of aluminum 3 and the three layers of glass cloth 4. It was found that the wooden block 1 did not suffer burning, cracking or any other type of loss of form for a relatively long time which would be detrimental. This could be presumably attributed to the fact that considerably less heat reaches the block 1 than is the case in a block not having the layers 3 and the layers 4. The layers of aluminum foil 3 are heat-reflective and so tend to reflect radiant heat back towards the glass sheet being pressed and reduce the amount of radiant heat falling on the block 1. The layers of woven glass cloth 4 serve to reduce the amount of heat transmitted to the wooden block 1 by conduction.

It is not critical whether the layers of metallic foil and the layers of heat-resisting thermal insulating material are arranged with a layer of metallic foil lying directly beneath the glass-contacting covering layer and a layer of thermally insulating heat-resistant fibrous material directly on top of the wooden block or vice versa. Indeed, it is not important that there should be an equal number of layers of metallic foil and layers of thermally insulating heat-resistant fibrous material. Thus, it would be possible to have a construction in which a layer of heat-reflective metallic foil lies immediately beneath the glass-contacting covering layer and another layer of heat-reflective foil lying

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immediately upon the wooden block. Sandwiched between these two layers of metal foil there would at least be one layer of thermally insulating heat-resistant fibrous material. It would also be possible to have a construction with one layer of a thermally insulating heat-resistant fibrous material lying immediately beneath the glass-contacting covering layer and another layer of thermally insulating heat-resistant fibrous material lying immediately above the block in which case there would be sandwiched between these two layers at least a layer of heat-reflective metallic foil.

The present invention, although described as being employed to shape glass supported vertically, it is also capable of use in press bending operations wherein glass sheets are supported horizontally during their shaping.

I claim:

1. A molding member for use in the press bending of glass sheets comprising a wooden block having a shaping surface conforming to that desired for a glass sheet to be press bent, an outer glass-contacting covering layer of mineral fibers overlying said shaping surface, and sandwiched between said shaping surface of said block and said covering layer, at least one layer of heat-reflective metallic foil and at least one layer of a thermally insulating heat-resistant fibrous material.

2. A molding member according to claim 1 wherein said layer of heat-reflective metallic foil is aluminum foil.

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3. A molding member according to claim 1 wherein said layer of thermally insulating heat-resistant fibrous material is a layer of woven glass cloth.

4. A molding member according to claim 1 wherein there are sandwiched between the shaping surface of said block and said covering layer three layers of heat-reflective metallic foil and three layers of a thermally insulating heat-resistant fibrous material, said layers of metallic foil and said layers of fibrous material alternating with one another.

5. A process according to claim 4 wherein each of said layers of metallic foil is of aluminum foil.

6. A molding member according to claim 4 wherein each of said layers of thermally insulating heat-resistant fibrous material is of woven glass cloth.

7. A molding member according to claim 4 wherein said glass-contacting covering layer is of knitted glass cloth.

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