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Oswald et al.

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[54] **HAMMER BOARD**

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[51] **Int. Cl.**[2]..... **B21J 7/06**

[58] **Field of Search** 72/435, 439; 173/90, 124; 161/127, 139, 68, 69

[56] **References Cited**

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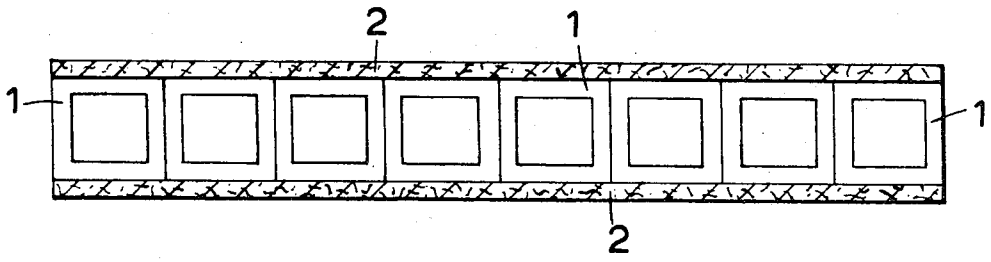
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Attorney, Agent, or Firm—Neuman, Williams, Anderson & Olson

[57] **ABSTRACT**

A hammer board for drop hammers used in forging comprising a metal body faced on each side with a high friction material, the body is preferably of aluminium tubes, juxtaposed and the facing is a rigid material bonded to the tubes.

4 Claims, 4 Drawing Figures



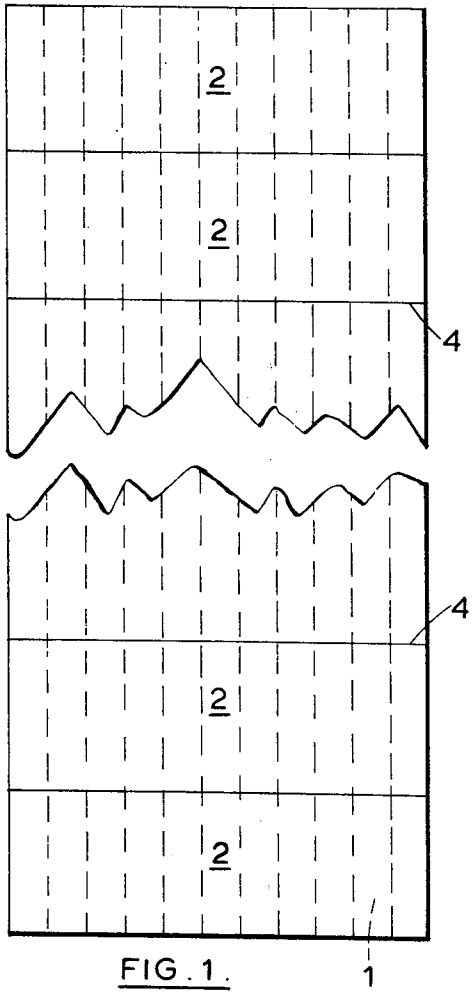


FIG. 1.

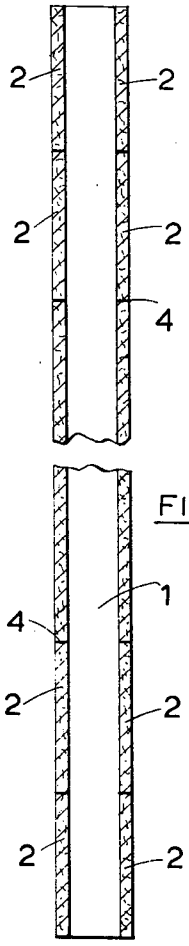


FIG. 2.

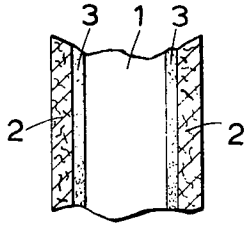


FIG. 4.

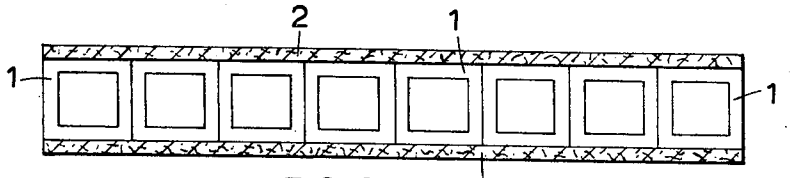


FIG. 3.

HAMMER BOARD

This invention relates to a board for a boardtype drop hammer used in forging operations, that is to say a drop hammer of the kind in which the tup is driven vertically by a board which replaces the belt in belt driven hammers.

The drop hammer mechanism for driving the board usually comprises two contra-rotating driven rollers or one driven and one free-wheeling roller which are movable toward and away from each other by any convenient known mechanism controllable by the operator. The tup is connected to the foot of the board which is mounted vertically between the rollers. In operation the board is gripped by the rollers when it is desired to raise the tup and released at the moment it is desired to drop the tup onto the workpiece. This action has an extremely deleterious affect on boards of the type currently in use and consequently their working life is short and in some cases may be no more than a few hours.

Hitherto some types of hammer board have been made from single pieces of wood or from a number of thin wood laminations which are bonded together to provide a hard, compression resistant body. Boards made from laminations of lignum vitae have proved to be the most durable but they are expensive to manufacture.

The opposed faces of the board are usually covered with a hard wearing cloth based material in order to prolong the working life of the board and to provide those surfaces which are gripped by the rollers with a material having a high co-efficient of friction. The cloth facing material is sometimes bonded to the board in laterally disposed strips in order to reduce the problem of stretching the warp threads under the continual working of the rollers.

Despite all previous attempts to improve hammer boards and extend their working life they remain expensive to produce and their working life is still all too short. Even in the case of the more durable but more expensive laminated boards it has been found that under the severe working stresses imposed upon them the laminations tend to separate and the board then has to be scrapped as repair is uneconomical.

It is an object of the present invention to provide an improved hammer board which is cheaper to produce and more durable in operation than those used hitherto.

According to this invention we provide a hammer board comprising in combination an elongate metal body having opposed flat working faces, a layer of facing material having a high co-efficient of friction at least partially covering said faces and an adhesive bonding agent, bonding said material to said faces.

By working faces we mean those opposed faces of the board which are, in use, clamped between the rollers of the hammer drive mechanism.

The body of the board may be a unitary metal member, which can be either solid or hollow, but preferably comprises a plurality of similar elongate metal members joined together in contiguous side by side disposition to form co-planar working faces.

Where the board is formed from a plurality of elongate metal members, the members are preferably tubes of square or rectangular cross section. The tubes may be filled with another substance, such as resin, to provide additional strength or may have internal bracing members such as webs or ribs. The ends of the tubes may be closed by caps or plates if desired. Combinations of both square and rectangular sectional tubes may also be used. In another arrangement the metal members may be of I cross section.

In order to keep the weight of the boards to a minimum the tubes are preferably of aluminium, or aluminium alloy, and are joined by means of the facing material which is bonded to each of the working faces by means of a powerful adhesive which may be of a known make. Preferably the adhesive is of the thermo setting kind.

For added strength the tubes may also be bonded directly to each other by applying bonding material to the sides of the tubes, before the facing material is added.

Any suitable facing material having a high coefficient of friction can be used to face the board but where a number of elongate members are to be connected by means of the facing material only it is desirable that it should be a substantially rigid material. Preferably, short strips of such facing material having a length equal to the width of the board are bonded across the elongate members in a side to side abutting relationship and extending over substantially the entire length of the board. Gaps may be left between the strips if desired.

A preferred embodiment of the invention will now be described by way of example only with reference to the accompanying drawings wherein:

FIG. 1 is a plan view of a hammer board according to this invention;

FIG. 2 is a side elevation of the board of FIG. 1;

FIG. 3 is an end view of the board of FIGS. 1 and 2; and

FIG. 4 is a view similar to that of FIG. 2 but showing an enlarged section of board.

According to this embodiment a hammer board of between 8 and 9 feet in length and 3 and 15 inches in width, dependent upon the weight of hammer to be operated, is constructed from a plurality of identical aluminium tubes 1 having a uniform square cross section of 1 inch. The ends of the tubes 1 are cut normal to the longitudinal axis and left open. The tubes are connected together in a side to side abutting relationship by means of short pieces of tough, substantially rigid facing material 2 which is bonded to opposed co-planar faces of the tubes which together constitute the working faces of the board. The facing material 2 also provides a friction surface for the driving rollers of the drop hammer. The facing material 2 is preferably of the kind marketed under the Trade Mark DON A101 which is a solid woven cotton brake lining.

Each piece of facing material 2 is 8 inches wide, ¼ inch in thickness and between 3 and 15 inches in length. The length of each piece of material 2 is chosen to be consistent with the width of board required so that it extends to the edges of the board. Both working faces are completely covered by the material 2 although small gaps may be left at the joins 4 to allow for the "rolling out" of the material in use. The bonding agent may be of any suitable kind but a rubber based thermo setting adhesive of the kind marketed under the Trade Mark PLASTILOCK is preferred.

When constructing the board the aluminium tubes 1 are held in juxtaposition in a suitable jig and after applying an even coating of the bonding agent, indicated by the reference numberal 3, over the entire surface

area of the opposed working faces of the board the strips of material **2** are added, and the board is then placed in a press so that the facing material **2** is clamped to the working faces. Heat is then applied to the board to cure the bonding agent. This may be carried out in an oven or by means of a pair of plate-like heating elements which extend along the length of the board on both sides. Such elements may form part of the press as, with the preferred type of adhesive, the bonding is carried out under a pressure of approximately **150** lbs per square inch.

Although in this preferred embodiment the board is faced over its entire length, it will be appreciated that a portion adjacent to each end which is not gripped by the drive rollers need not be so faced or may be faced with a different material. In use the lower end of the board is wedged in the tup and instead of a single wide board suitable for the weight of hammer to be operated, several narrow boards may be used together.

Similarly, it will be appreciated that other arrangements of the facing material are possible. A board could for example be covered by a single strip of facing material, or perhaps two or three strips, which are the same width as the board. Also, the joins **4** between the strips may be made at an angle to the sides of the board if desired.

In one modified form of board according to this invention the aluminium tubes are bonded directly to each other prior to the facing material **2** being added by applying the bonding material **3** to the sides of the tubes **1** before they are clamped together. This is not essential but provides added strength.

By constructing hammer boards from a plurality of separate aluminium tubes it is possible to produce a board which is light in weight as compared with the known wooden boards, durable in use, and easy to manufacture as standard drawn aluminium tubes may be used. The individual tubes help to reduce localised stresses in use and any tendency for the board to warp or twist. Moreover, boards made according to this invention are more readily repaired or salvaged for further use than known boards.

I claim:

1. A hammer board comprising in combination an elongate metal body having opposed, substantially parallel, flat working faces; said body being formed from a plurality of similar, hollow, elongate aluminum metal members of rectangular cross section extending side-by-side in a surface-to-surface relationship and parallel to the longitudinal axis of said body; each of said working faces being at least partially covered by a strip of facing material having a high co-efficient of friction; said strip being bonded by an adhesive bonding agent to said faces whereby said members are secured together as a unitary member.

2. A hammer board as claimed in claim **1** wherein said adhesive bonding agent secures adjacent side faces of said tubes together in rigid juxtaposition.

3. A hammer board as claimed in claim **2** wherein said facing material comprises a plurality of rectangular strips of substantially rigid material extending transversely to said longitudinal axis of said body, adjacent sides of said strips abutting each other.

4. The hammer board of claim **1** in which at least some of the ends of said tubular members have caps disposed thereover.

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