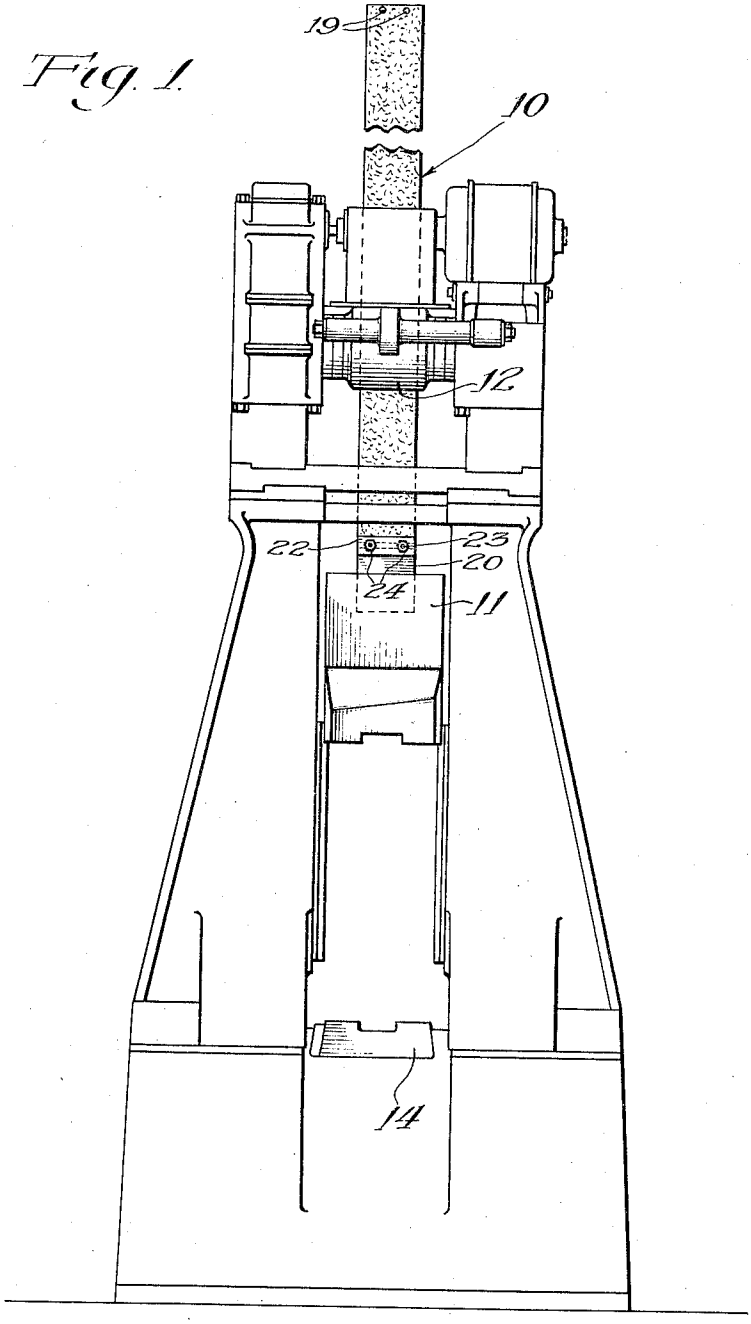
June 11, 1940. G. H. LAWRENCE 2,204,222

BOARD FOR DROP HAMMERS

Filed Oct. 6, 1937 2 Sheets-Sheet 1

Fig. 1.



Inventor:
George H. Lawrence
By: Bertha L. MacGregor
Attorney.

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Fig. 2.

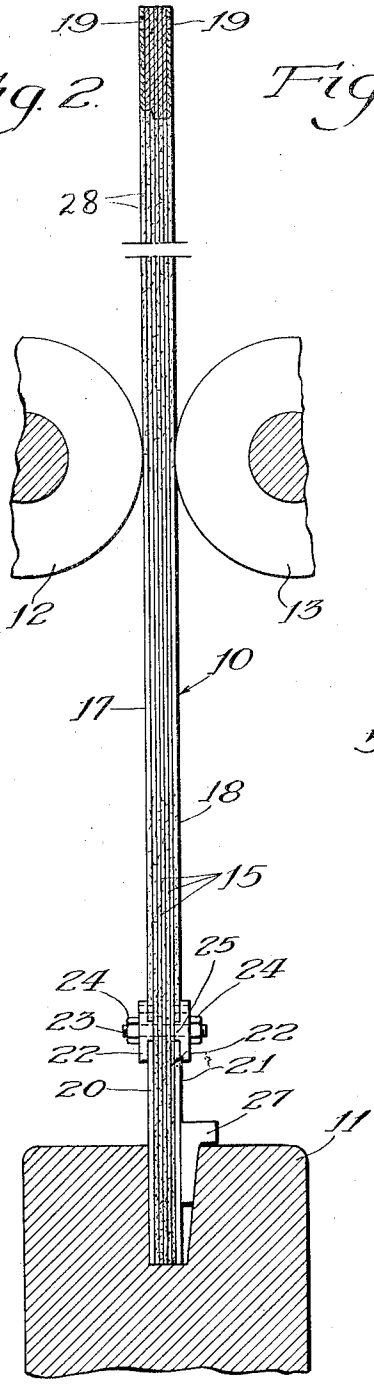


Fig. 3.

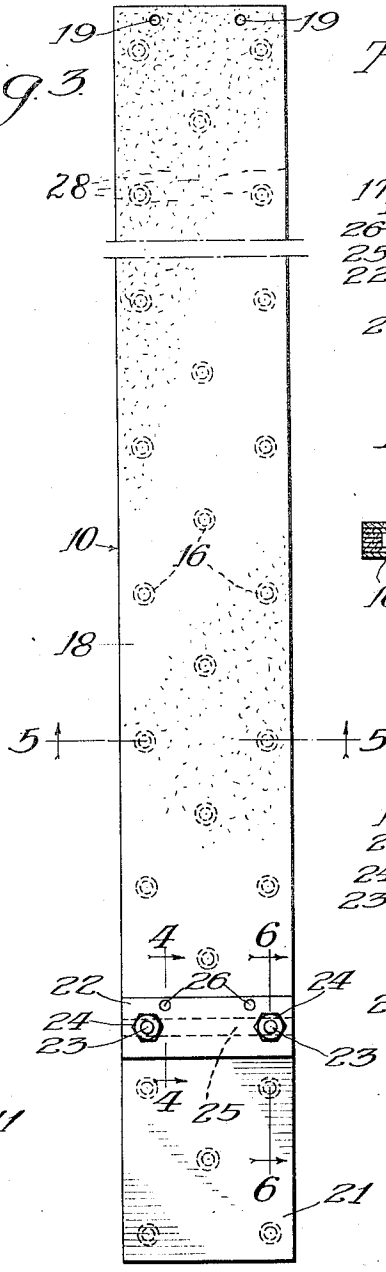


Fig. 4.

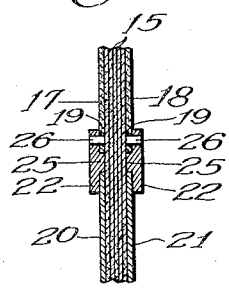


Fig. 5.

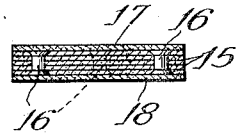
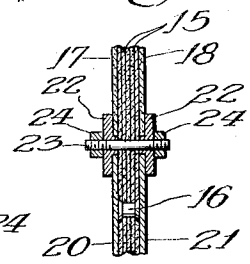


Fig. 6.



Inventor:
George H. Lawrence,
By: Bertha L. MacGregor
Attorney.

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UNITED STATES PATENT OFFICE

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BOARD FOR DROP HAMMERS

George H. Lawrence, Chicago, Ill.

Application October 6, 1937, Serial No. 167,603

7 Claims. (Cl. 78—29)

This invention relates to boards for board drop hamers.

Drop hammer boards heretofore have been made of hard wood, either solid, built-up or laminated. A board of the character described is adapted to have its lower end connected to a ram and the major portion of the board body above the ram is adapted to be frictionally engaged between rolls which rotate in opposite directions and cause the board to travel upwardly, thereby lifting the ram to a position from which it drops when released by the rolls and by the clamps which are provided for holding the board and ram in raised position.

Single wooden boards of desired width, either solid or laminated, as well as a plurality of narrower boards arranged in side edge abutting relationship, have been used. The prior art boards are unitary structures so far as their thickness is concerned, regardless of whether a single board is used or a plurality of boards are placed in side edge abutting relationship to provide the desired width of front and rear surfaces for roller engagement.

In a conventional board drop hammer, eccentric means is provided for firmly engaging the face of the board, across its width near its upper end, when the ram is in its lowermost position, to enable the oppositely rotating rolls bearing on the front and rear surfaces of the board to cause the board to travel upwardly between said rolls until the ram is in dropping position. This repeated operation results in wearing a pocket horizontally across the face of the board where the eccentric causes the roll to engage it, and to a lesser degree, also across the rear surface of the board opposite said pocket on the front face. It further results in crushing and wearing the board throughout the major portion of its body which is contacted by the rolls. This crushing and wearing of the board sometimes results in splitting of the wood and parts are thrown upwardly away from the hammer, endangering the lives of workmen.

In a normal day's operation of a board drop hammer, the board must be removed and be replaced by a new one at least once a day and sometimes twice. Each change requires one and one-half hours during which production is suspended, resulting in a loss of at least fifty dollars on account of lost production and cost of labor for making the replacement, exclusive of the cost of the boards. Such prior art boards cannot be reversed and used again because of the wear which thus affects them throughout the major portion of their bodies and both front and rear surfaces.

The main object of my invention is to overcome the objections noted and to produce a durable hammer board which will obviate the necessity for daily replacements and resultant lost production, and will effect substantial savings.

Another object is to produce a board which will not be crushed by the rolls between which it travels, and which will stand greater compression and provide greater surface friction between the board and rolls than is obtainable by using wooden boards, whereby the hammer, as a whole, functions more efficiently.

Another object is to provide a board construction which is capable of being partially replaced, in which worn portions may be reversed and reused, and in which other parts will last and may be used indefinitely.

Another object is to produce a board which may be partially replaced and in which worn portions may be reversed and reused, without disconnecting the ram from the board, whereby a great saving in time and labor is effected.

After much experimentation I have produced a board comprising a plurality of separate sheets of fibre, arranged in face abutting relationship, which is free of the objections inherent in prior art boards and has the qualities desired in efficient hammer boards.

The fibre sheets are made from cotton rags converted into paper. The paper is treated with concentrated zinc chloride and arranged, ply upon ply, until sheets of desired thickness are produced. The chemical is washed out, the pure fibre is dried in ovens, pressed flat in hydraulic presses and calendered smooth. The chemical reaction of the zinc chloride gelatinizes the cotton cellulose particles, causing the layers of paper to be chemically bound together. The composition of the paper is changed by chemical action, which is a result not attained by merely pressing or gluing the paper plies together.

Fibre produced by the method described is suitable for the purposes of my invention and it is referred to herein as an example of the fibre preferably used by me in the fabrication of hammer boards embodying my invention. Preferably the fibre sheets used can withstand a compression test of 32,000 pounds, whereas hard wood withstands a maximum of approximately 8,000 pounds.

In the drawings:

Fig. 1 is a front elevation of a conventional board drop hammer.

Fig. 2 is a side elevation, partly in section, on

a larger scale than Fig. 1, showing a hammer board embodying my invention, the lower end being connected to the upper part of a ram which is partially broken away.

Fig. 3 is an elevation of one face of the board.

Fig. 4 is a vertical sectional view taken on the line 4—4 of Fig. 3.

Fig. 5 is a horizontal sectional view taken on the line 5—5 of Fig. 3.

Fig. 6 is a vertical sectional view taken on the line 6—6 of Fig. 3.

In that embodiment of my invention shown in the drawings, the hammer board is designated 10 in Fig. 1, and its lower end is connected to a ram 11. A roll 12 engages the front surface of the board 10 and a roll 13 engages the rear surface of said board, and rotation of the rolls in opposite directions causes the board to travel upwardly, as shown in Fig. 1, to a position where the roll 12 disengages the board and when the conventional holding clamps are released, the ram drops to the anvil 14.

The construction of the board 10 is best shown in Figs. 2 to 6, inclusive. It comprises an inner or center board 15 made of a plurality of separate sheets of fibre, arranged in face abutting relationship, and cemented together by any suitable means. Countersunk steel rivets 16 extend through the plurality of sheets comprising the board 15 and hold them rigidly together. The sheets are as long and as wide as the board 10, as a whole. Their thickness may vary but I prefer to use sheets which are $\frac{3}{16}$ inch or less in thickness. The number of sheets used to make the center board 15 will depend on the thickness of the sheets and the thickness of center board which, in a hammer board 84 inches long and 10 inches wide, is usually 1 to 1¼ inches thick.

Abutting the outer faces of the laminated center board 15, are separate outer sheets 17 and 18, respectively, also made of fibre, and preferably $\frac{3}{16}$ inch thick. The sheets 17 and 18 are as wide as the sheets of the center board 15, but not as long. The sheets 17 and 18 extend from the top edge of the board to about 12 inches from its bottom edge. Apertures 19 are provided near the upper and lower edges of each of said outer sheets 17 and 18 for a purpose to be described.

Also abutting the outer faces of the center board 15, in that portion below the outer sheets 17 and 18, respectively, are steel sheets 20 and 21, of the same thickness as the outer fibre sheets 17 and 18. The steel sheets 20 and 21 extend from the bottom edge of the center board upwardly nearly to the lower edge of the outer fibre sheets 17 and 18, respectively.

The parts 15, 17, 18, 20 and 21 are held in assembled relationship, the outer fibre sheet 17 and steel sheet 20 abutting one face of the center board 15, and the outer fibre sheet 18 and steel sheet 21 abutting the opposite face of the center board, by means of a pair of plates 22, a stud 23 and nuts 24. Each plate 22 comprises a flat piece of metal as long as the board 10 is wide, and approximately 3 inches in width. On its inner face, about midway between its upper and lower edges, the plate 22 is provided with a horizontally disposed, longitudinally extending rib 25. Above the rib 25, a pair of dowels 26, 26 project from the plate. When the parts are assembled as shown in Figs. 2 and 3, the ribs 25 of the oppositely located plates 22 occupy the space between the lower edges of the outer fibre sheets 17 and 18 and their associated steel sheets 20 and 21, and the dowels 26, 26 extend into the apertures 19 in the lower portions of said outer fibre sheets. The stud 23 is screw threaded on both ends. It extends through the plates 22 and center board 15 and when the nuts 24 are tightened on the stud 23, the separate parts of the board 10 are held in assembled relationship.

The lower portion of the board 10 is connected to the ram 11 by any suitable means, such as the wedge 27 shown in the drawings.

When the board 10 has been installed in the hammer, the roll 12 bears on the outer surface of the outer sheet 17, which is the front surface of the board as a whole, and the roll 13 bears on the outer surface of the sheet 18 which is the rear surface of the board. As heretofore explained, the engagement of the front face of the board by the eccentric roll results in the greatest wear, and wooden boards are also worn and crushed wherever the rolls contact them. In my construction, the fibre sheets are not noticeably affected by the rolling contact but the face of the front sheet 17, after being used for several days, shows some wear at the part 28 where the "pick-up" engagement of the eccentric occurs and the rear face of the sheet 18 shows a lesser degree of wear at the part opposite that indicated at 28. When such wear detracts from the gripping function of the rolls, the sheets 17 and 18 may be reversed so that the bottom ends will be toward the top and their initially inner faces will be outwardly facing and be contacted by the rolls.

The reversal may be effected without disconnecting the ram from the board 10. The nuts 24, 24 are loosened sufficiently on the stud 23 to allow the plates 22 to be moved slightly away from the outer sheets 17 and 18, so as to release the dowels 26, 26 from the apertures 19 in said sheets, and then the sheets may be moved away from the center board 15 and be reversed as described, or new sheets 17 and 18 may be installed.

The reversal of the outer sheets doubles their usefulness and the replacement of said sheets by new ones is relatively inexpensive, for the center board 15 and steel sheets 20, 21, do not require replacement. It is to be noted that the reversal and doubled use of the sheets 17 and 18 is made possible not only by reason of the sectional construction of the board 10, that is, by making the members 17, 15 and 18 separate, but by reason of the absence of worn surfaces in that part of the board which is subjected to rolling contact, for if the board surfaces were thus worn it would be impractical to reverse the members 17 and 18. This advantage is attained by constructing the separate members of fibrous material of the character described.

The number of members constituting the center board 15 and the board 10 and their sizes and thicknesses may be varied, and changes may be made in details of construction without departing from the scope of my invention.

I claim:

1. A hammer board comprising a center board, an outer fibre sheet abutting each face of the center board but separate from said board, said outer sheets being apertured near both ends, and detachable holding means for holding said parts in assembled relationship, said holding means comprising a pair of plates having dowels adapted to engage the apertured ends of the outer sheets, a stud extending through said plates and center board, and nuts on the ends of the stud

for holding said plates against opposite sides of the assembled board.

2. A hammer board comprising a center board consisting of a plurality of fibre sheets and countersunk rivets connecting said sheets in face-abutting relationship, an outer fibre sheet abutting each face of the center board but separate from said board, said outer sheets being apertured near both ends, and detachable holding means for holding said parts in assembled relationship, said holding means comprising a pair of plates having dowels adapted to engage the apertured ends of the outer sheets, a stud extending through said plates and center board, and nuts on the ends of the stud for holding said plates against opposite sides of the assembled board.

3. A hammer board comprising a center board, outer fibre sheets abutting said center board at opposite faces and extending from the upper edge of the center board to a point intermediate the upper and lower edges, outer sheets of rigid material abutting said center board at opposite faces and extending from the lower edge of the center board nearly to the outer fibre sheets, and holding means engaging the proximate portions of said fibre and rigid sheets at opposite sides of the board for holding the parts in face-abutting relationship and supporting the fibre sheets.

4. A hammer board comprising a center board, separate relatively thin outer sheets abutting said center board at opposite faces of the board, each of said outer sheets consisting of a roll engaging piece and a ram engaging piece, and readily detachable means engaging the proximate portions of each of said pieces at opposite sides of the board and holding the parts in assembled but quickly separable relationship.

5. A hammer board comprising a center board of fibrous material, separate relatively thin outer sheets abutting said center board at opposite faces of the board, each of said outer sheets consisting of a roll engaging piece of fibrous material and a ram engaging piece of metallic material flush with each other, and readily detachable means engaging the proximate portions of each of said pieces at opposite sides of the board and holding the parts in assembled but quickly separable relationship.

6. A hammer board comprising a plurality of separate sheets of fibrous material, readily detachable clamping means engaging the outermost sheets near their lower ends and holding said outer sheets in face-abutting but unconnected relationship to an intermediate sheet, and means separate from said clamping means for connecting said intermediate sheet to a ram, said outer sheets terminating short of the connection of the intermediate sheet with the ram, whereby the outer fibre sheets may be removed and reversed without disconnecting the hammer from the intermediate sheet.

7. A hammer board comprising a center board consisting of a plurality of fibre sheets and countersunk rivets connecting said sheets in face-abutting relationship and means for connecting said board to a hammer, an outer reversible fibre sheet abutting each face of the center board but separate from said board, and readily detachable means engaging said outer sheets near their ends and separate from said hammer connection means for holding said center board and outer sheets in assembled, unconnected and quickly separable face-abutting relationship, said outer sheets terminating short of the connection of the center board with the ram, whereby the outer fibre sheets may be removed and reversed without disconnecting the hammer from the center board.

GEORGE H. LAWRENCE.