

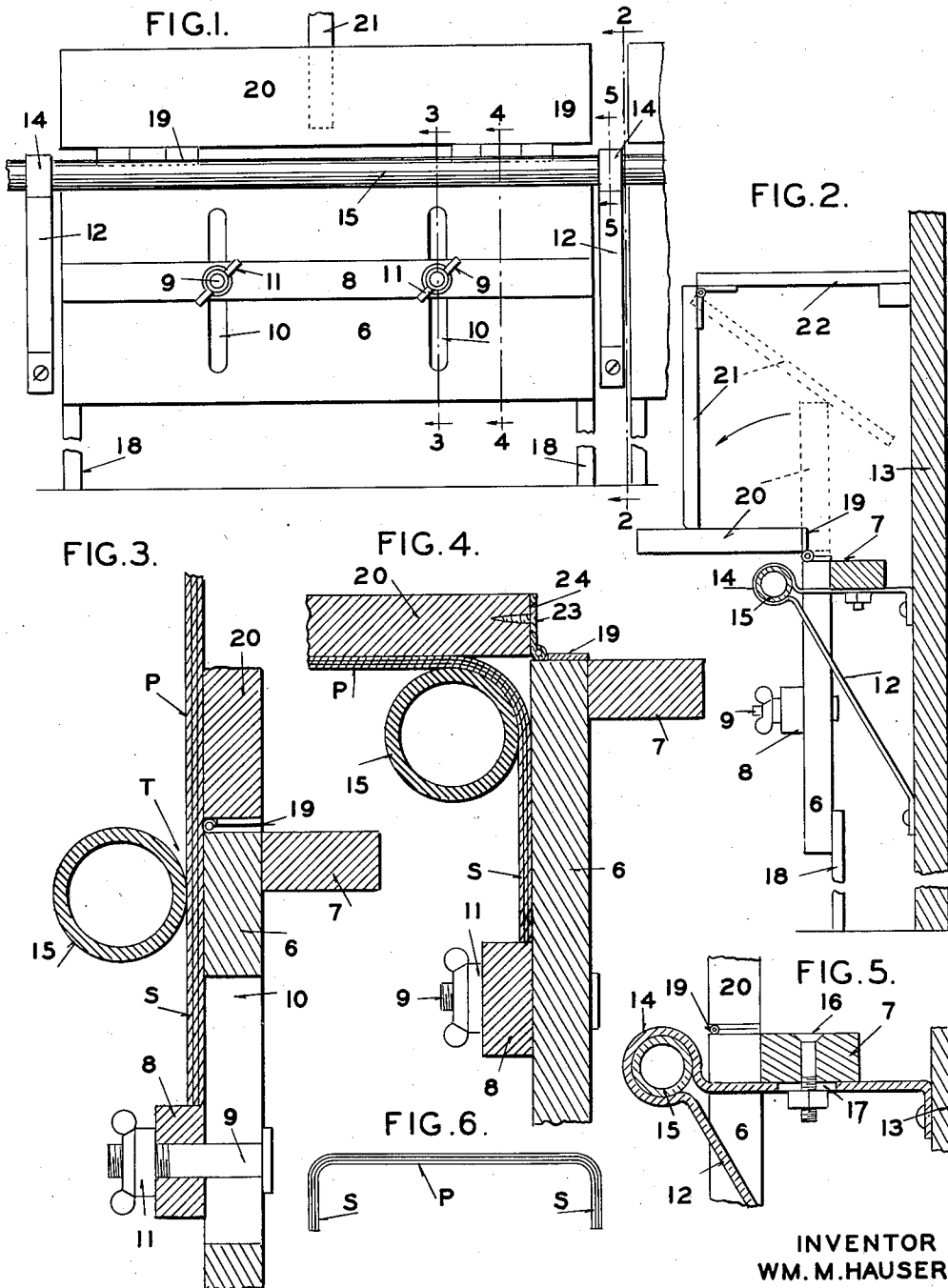
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MEANS FOR BENDING PLYWOOD

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MEANS FOR BENDING PLYWOOD

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1 Claim. (Cl. 144—259)

It has been found desirable in forming light and strong articles, such as luggage, to bend one or both ends of a strip of plywood at right angles to the body of the strip. Heretofore this bending operation has usually been carried out between a die and form requiring the use of a cumbersome and expensive press. Further, when this method is employed, particularly to form a bend of short radius, the outer layer of the plywood forming the convex surface of the bend or corner is liable to check or crack, thus producing faulty work. To overcome this difficulty it has been customary to cut away one or more of the plies of the wood on the side which is to form the concave face of the bend. After the bend is formed it is reenforced either with the material removed or another piece of stock. This requires a second use of the press with its die and form to complete a single bend.

It is the object of my invention to provide a simple means whereby bends may be formed in plywood rapidly and inexpensively without removal of stock therefrom and without liability of checking or cracking.

In the accompanying drawing which illustrates one form of apparatus for carrying out my invention Figure 1 is a front elevation; Figure 2 is a section taken on the line 2—2 of Figure 1; Figure 3 is an enlarged section taken on the line 3—3 of Figure 1, a strip of plywood being shown in its initial position; Figure 4 is an enlarged section taken on the line 4—4 of Figure 1, the strip being shown after the bending operation is completed; Figure 5 is an enlarged section taken on the line 5—5 of Figure 1; and Figure 6 is an end view of one form of work adapted to be produced by my method and means.

One form of work adapted to be produced by my method and means (shown in Figure 6) consists of a strip of plywood P, the body of which forms either the top or bottom of a piece of luggage such as a suitcase, handbag or trunk. The ends S of this strip, known as skirts, are turned over at right angles to the body and form the sides or ends of the top or bottom member of the completed article. The machine for carrying out the bending operation comprises a vertical apron 6 supported from a cross rail 7 and carrying a stop 8. This stop is vertically adjustable by means of bolts 9 passing through slots 10 in the apron and provided with wing nuts 11. The width of the apron is such as to accommodate one or more of the strips P as desired, and its depth is sufficient to receive the longest skirt which it is desired to form. Rail 7 is carried

on brackets 12 secured to any suitable support 13 such as the wall of a building. The brackets are provided with loops 14 positioned in front of the apron adjacent its upper edge. Carried in these loops 14 is a steam pipe 15, the outside diameter of which is the same as the inner radius of curvature of the bend or corner to be formed. The distance between the pipe and the face of the apron should be the same as the thickness of the plywood to be bent. To accommodate strips of different thickness, rail 7 is secured to the brackets by bolts 16 (Figure 5) passing through the rail and through slots 17 in the bracket so that the distance between the pipe and apron may be adjusted. To provide additional support for the apron, feet 18 extending to the floor are preferably employed.

Pivoted to the upper edge of the apron by hinges 19 is a forcing board 20 of the same length as the apron. Its width should be such that it will extend a considerable distance beyond the pipe when in its horizontal position as shown in full lines in Figure 2. It should not, however, be too great as the "feel" of this board is of great assistance to the operator in carrying out the bending operation at the proper speed to secure the best results. The board is maintained in horizontal position by a strut 21 pivoted to an arm 22 on the support 13. The distance between the lower face of the board when in horizontal position and the pipe should be equal to the thickness of the plywood. To vary this distance to accommodate different thicknesses, the board may be secured to the hinges by a screw 23 passing through a slot 24. I find in practice, however, that where the variation in thickness is not too great, this adjustment may be dispensed with and the variation in thickness accommodated by swinging the board to a position slightly above or below the horizontal. The slight deviation from a right angle in the bend resulting from this is readily corrected in assembling the article.

In carrying out my invention, the pipe 15 is supplied with steam at a temperature somewhat above that of boiling water. I have found steam at a temperature resultant from a pressure of ten pounds per square inch to be satisfactory. The stop 8 is adjusted to secure the proper depth of skirt and the strip of plywood inserted between the pipe and apron as shown in Figure 3. This forms a trough T between the pipe and strip for the reception of water. Before applying water to the trough it is advisable to swing the board slightly forward to insure a substantially water-tight contact between the pipe and

strip. This is for the double purpose of insuring the retention of sufficient water in the trough to complete the bending operation and preventing the passage of any appreciable amount of water down onto the end of the strip. Such wetting of the end is liable to cause warping of the skirt as often occurs when the entire strip is steamed as is usual when a bend is formed by the use of dies. Water is supplied to the trough in any suitable manner, preferably by the use of a brush. The contact of the water with the heated pipe immediately raises its temperature to the boiling point. The movement of the forcing board is now continued until it is in horizontal position. This movement progressively brings the various parts of the bend into contact with the pipe, at the same time forcing the boiling water up around the pipe to progressively impregnate the parts of the strip to be bent.

The bending is accomplished by the application of the substantially constant pressure, there being a progressive "yield" due to permanent alteration or "deformation" in the structure of the strip as succeeding portions are brought into contact with the steam pipe. This yielding is apparent to the operator and while the movement of the board in bending may be fairly rapid, the operator should not attempt to complete the bend at more rapid rate than at which said change occurs as this would establish strains which may result in checking or splitting the outer layer of the plywood. While I do not wish to restrict the scope of my invention to any theory as to the nature of the progressive alteration in the structure of the strips that occurs during

bending, I believe that it consists either in rearrangement of the fibers in the strip or the slipping of one ply over another due to the softening of the glue used in forming the plywood strip or to both of these actions.

After the bending operation is completed, the board is secured by strut 21 and held in this position until it has dried. This, I find, usually requires about four or five minutes. To secure the most economical results from the use of my method, the machine should comprise a number of units such as described so that the operator may proceed from one unit to another in the bending operation. The number of units employed is preferably such that when the bending operation in the last one is performed, the strip in the first one will be properly dried so that production is rendered continuous.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

In a device for bending a strip of plywood, an apron, a steam pipe positioned adjacent the face of said apron, a stop on said apron for positioning a strip of plywood inserted between said pipe and apron, the face of said apron being approximately vertical, whereby a water receiving trough is formed between said pipe and strip, a forcing board pivotally mounted on said apron to progressively bend said strip around the pipe, and a pivotally mounted strut positioned above said forcing board and engaging therewith to retain it in substantially horizontal position.

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