The present invention relates to the manufacture of boards for that kind, which are composed of a plurality of wood layers glued together and more particularly it has for its object to provide a method of manufacture and an appertaining equipment adapted for the industrial manufacture of such boards. The invention is substantially characterized by the fact that those parts of which each separate board is to be composed, are placed in a matrix or fixture, in which they are arranged and fixed in their proper positions, whereupon they are joined together by gluing in a press, preferably while applying heat to the board. The matrix or fixture employed may, for example, consist of a box or like the open, at the top, the end and side walls of which are so adjustable that the parts placed in the matrix may be firmly retained by being pressed together between the walls of the matrix.

The invention will be more closely described with reference to the accompanying drawings, in which Figure 1 shows diagrammatically an arrangement according to the invention, intended to be employed in a continuous manufacture of boards of the kind in question.

Figure 2 is a plan view of the matrix in which the boards are manufactured.

Figure 3 is a side view and
Figure 4 an end view of said matrix.

Figure 5 is a section along line 6—6 of Figure 1 on a larger scale.

Figure 6 shows the tensioning device in plan view and
Figure 7 is a section along line 7—7 of Figure 6.

Figure 8 illustrates the industrial manufacture of the parquet boards while using matrices arranged on a horizontal table 2 and adapted to be capable of displacement on the table in the direction of the arrows with the aid of a suitable feeding device. The matrix shown on the drawings is a twin-matrix adapted for the simultaneous manufacture of the two boards. It comprises a base plate 21 and four longitudinal bars 19, 20, 22, 23 consisting of angle irons, the two outer bars 19, 20 of which are fixed, whereas the central bars 22, 23 are laterally displaceable. Said bars form two parallel channels which at one end are confined by transverse angle irons 37, 38.

The design of the board appears from Figures 1 and 5. In the shown example the board comprises a parquet veneer layer of parquet veneer lengths 6, 6, a core layer or filling layer consisting of longitudinal lengths 11, a binding layer 51 consisting of veneer having its run of grain extending in a transversal direction to the board, and a covering layer 52 consisting of veneer having its run of grain extending in the longitudinal direction of the board.

The manufacture is carried out in following manner. The parquet lengths 5, 6 are first manufactured in lengths corresponding to the parquet pattern and are given exactly those dimensions they are intended to have in the finished parquet board. Furthermore, the lengths 11 which are intended to form the core layer or filling layer are cut out beforehand. These lengths may be of the same length as the board. They are, however, provided with transversal incisions which are cut from two or more sides in order to prevent casting or distorting. In the present case, however, comparatively short lengths 11 are used, which are of the same width but may be of varying length, for instance 10 to 20 cm. and which are placed in rows after each other so as to contact closely with each other at the ends. It should be observed, however, that the lengths in adjacent rows have to overlap each other, so that the ends of the lengths become displaced in relation to each other in the longitudinal direction. Those lengths which form the outer edges of the board may, if desired, be made in uninterrupted pieces provided with transversal incisions and being of the same length as the board, whereas the remainder of the core layer is composed of short lengths. As shown in Figure 5, the lengths may be placed in such a way that a slight free clearance is formed between the rods for the purpose of compensating a possible lateral swelling. In order to facilitate the laying-in of the rods in the matrix it may, however, be suitable to provide the lengths with grooves or the like at their side surfaces facing each other, so that the lengths, upon being introduced into the matrix, may be brought into direct contact with each other in the lateral direction. In most cases, it is sufficient to use for that purpose, in sawing out the lengths along the lateral edges, a saw with coarse cut, so that the lengths obtain at said sides a rough surface structure which, while at the same time supporting the lengths sideways, still permits a lateral expansion of the lengths caused by moisture. Finally, those pieces of veneer are cut out beforehand, which are designed to form the binding and covering layers 51, 52.

By using the material thus obtained the boards are manufactured in such a manner that the parquet veneer lengths 5, 6 are first placed on the base plate 21 in the desired pattern between the
longitudinal bars 19, 20, 22, 23. Thereupon the lengths 11 of the filling layer are laid on the parquet veneer layer. Simultaneously with or prior to the introduction of the lengths 11 into the matrix, the lengths and the lengths of the filling layer have been provided with a coating of glue on the surfaces facing each other. This may be effected by applying a thin lamina or film of glue which is dry at ordinary temperatures, between the different layers. After the various parts have been accurately fitted into their correct positions in relation to one another, the edge bars of the matrix are pressed against the parquet veneer layer so that this layer is firmly fixed in the matrix. Finally, the veneer layers 31, 32 are applied which, in addition to the necessary glue layers, are attached to the lengths 11, for example by means of tacks or pins. The different parts are thereby fixed relatively to one another. The matrix with the boards thus assembled is then introduced into a press, whereupon the boards are subjected to heat and pressure, in the course of which the glue melts. After the press plates have cooled down and the glue has set, the matrix is removed from the press.

The introduction of the parquet lengths into the matrix is effected mechanically with the aid of push rods 3, 4, by means of which groups of parquet lengths 5 and 6, respectively, can be fed forward from vertical stacks of such parquet lengths placed in magazines 1, 2. The parquet lengths are so arranged in each magazine that each layer corresponds to a square in the parquet pattern of the width of the board being produced. In the first working position of the matrix 1 one of the channels in the matrix is located opposite the magazine 3, which is filled with parquet lengths 6 disposed in the longitudinal direction of the matrix. Between the matrix and the magazine 3 on the level of the base surface of the matrix there is arranged a table 5 designed to receive a group of transverse parquet lengths 5 from the magazine 7. The push rods 3 and 4 which are not thicker than the parquet lengths, are so arranged as to advance each time the lowermost layer in the stack. Upon actuation of the push rod 3, three parquet lengths 5 on the table 5 are thus advanced into a position midway between the magazine 3 and one of the channels of the matrix. When the push rod 4 is subsequently actuated, said lengths 5 together with the lowermost layer of lengths 6 in the magazine 7 are pushed into the matrix. This operation is repeated as many times as are necessary for the channel in the matrix to be filled with parquet lengths along the whole of its length. After this, the matrix is advanced by a short step so that the other channel comes into position in front of the table 5, which channel is then filled with parquet lengths in the same way as just described.

The matrix is then advanced a long step so that one of its channels comes into position right opposite a table 10, on which the filling lengths 11 are advanced. Before the last-mentioned lengths are introduced into the matrix, a layer of double glue is applied to the parquet layer. The table 10 has the same length as the matrix and is designed to receive all the lengths appertaining to a channel, before they are introduced into the matrix. In the example shown the filling lengths 11 are of varying length. They must, therefore, first be arranged so that the ends will come to lie displaced in relation to one another in adjacent rows. This is effected on an endless conveyor band 12, which is arranged to travel around rollers 13, 14 past a table 15 disposed on a level therewith on which the lengths 11 are first placed. After a sufficient number of lengths has been placed on the conveyor band so that the lengths contact closely with one another at the ends, the conveyor band is put into service so that the lengths are transferred to the table 10 arranged in direct connection to the conveyor band. The lengths thus enter into contact with an adjustable abutment 16 situated at the end of the table 10. Putting up the lengths can, if desired, be effected whilst the conveyor band is in motion, situated between the conveyor band and the table 10 at equal level with said table 10 is a supporting plate 17. Arranged in a narrow intervening space between this plate and the table 10 is an adjustable circular saw 18. After the lengths have been advanced on the table 10 to contact with the abutment 16 they are severed by means of the saw 18 while being suitably retained on the substructure, for instance with the aid of pressing plates or the like. After the abutment has been moved away, the lengths lying on the table 18 are pushed into the channel of the matrix which is then advanced by a short step, so that the other channel is brought into the proper position opposite the table 10. Another batch of lengths is now advanced on the table 10, whereupon these lengths are introduced into the other channel of the matrix in the manner above described.

The matrix is then advanced by a long step. In this position of the matrix, two layers of veneer are introduced together with the appertaining layers of glue into each channel. The matrix is thus prepared for being introduced into the press.

In the embodiment of the matrix shown in Figures 2 to 4, the longitudinally extending angle iron 19, 20 are rigidly connected with the bottom plate 21. To provide for lateral pressure on the layer of parquet veneer, two angle irons 22, 23 are made use of, which are adjustable in the transverse direction while being displaceably guided in this direction by means of guides 24 riveted to the bottom plate 21, Figure 7. The lateral displacement of the angle iron is effected by means of a draught-bar 25 inserted between the horizontal shanks thereof and having the thickness equal to the width of the angle iron. Lateral displacement is effected by means of a number of balls 27 introduced into recesses 26 between the draught-bar and the angle iron, said recesses being provided with oblique edge surfaces on which the balls are caused to roll up at a pull in the bar 28, the angle iron being then displaced in a lateral direction through a wedge-effect. The draught-bar 25 is provided at the end thereof with a screw bolt 29 passing through a yoke 30 adapted to abut against the end portions of the angle iron 22, 23, and connected to the ends of the angle irons by means of guides 30 facilitating lateral displacement of the angle irons relatively to the yoke. The displacement of the draught-bar 25 is effected by tightening up the nut 31, the angle iron being then pressed with the aid of the same magnitude against the lengths of veneer in the two channels of the matrix. The draught-bar 25 and the balls are retained in their places by means of a cover plate 32 which, in turn, is caused to bear on the upper sides of the draught-bar and the angle iron. In order to take a number of screw bolts 33 riveted to the bottom plate 21, said screw bolts passing through longitudinally extending apertures 34 in the draught-
2,401,648

5

bar 25 and being fitted with nuts 35 adapted to be tightened up against the upper side of the cover plate.

At the end of the matrix where the yoke 29 is located, the channels in the matrix are bounded by two angle irons 31, 32 rigidly connected with the bottom plate. At the opposite end of the matrix, the channels are bounded by a yoke 39 which is pivotally connected with the angle irons 19, 20 by means of tension bolts 40, 41 and studs 42, 43, arranged in blocks 44, 45 rigidly connected with the angle irons. When the matrix is to be filled, the yoke 35 is suspended on the studs 42, 43 in a position beneath the matrix. After the matrix has been filled, the yoke will be raised into a horizontal position, whereupon the yoke is applied to the end portions of the parquet lengths by tightening up the nuts 46, 47, said end portions projecting somewhat outside the matrix.

To retain the upper veneer layers, there may be provided a number of leaf springs on the angle irons 19, 20, 22, 23 in a manner such that the springs are bent downwardly in the glue press without interfering with the gluing operation.

The gluing having been effected, the board need not be subjected to any treatment other than that required for making the grooves and tongues in the lengths 11 forming the longitudinally extending edges of the board. In the example of embodiment illustrated in the drawings, the board is made in such manner that the layer of parquet veneer is not affected by this work.

To this end, the parquet veneer layer is displaced at the inner longitudinal edge thereof relatively to the core layer to an extent corresponding to the width of the tongue, which is attained through the arrangement of longitudinally extending bars 36 on the bottom plate 21 inside the fixed outer angle irons 19, 20, said bars having a width corresponding to that of the tongue. The tongue is then cut out in the side edge of the parquet length to a depth corresponding to said displacement between the two layers. At the same time the veneer layers 51, 52 are also severed to a corresponding extent. On the opposite side of the board, a groove is cut in known manner into the side edge of the outer length 11. In order that the tongue shall not be severed by the incisions provided in the filler lengths, it may be found suitable to provide the outer edge lengths 11 with incisions from one side only, that is to say from the inner side edge.

I claim:

1. A matrix comprising a bottom plate, adjustable bars extending longitudinally and medially of said bottom plate, stationary walls on said bottom plate arranged opposite said bars and forming two channels therewith, means for retaining said bars in position to apply lateral pressure to composite boards located in said channels, an adjustable wall at one end of said channels in the form of a yoke, and means supporting said adjustable wall to swing to a position affording end-wise access to the channels.

2. A matrix comprising a bottom plate, adjustable bars extending longitudinally and medially of said bottom plate, stationary walls on said bottom plate arranged opposite said bars and forming two channels therewith, means for retaining said bars in position to apply lateral pressure to composite board located in said channels, an adjustable wall at one end of said channels in the form of a yoke, and means supporting said adjustable wall to swing to a position affording end-wise access to the channels, and a stationary wall at the opposite end of said channels.

3. A matrix comprising a bottom plate, a longitudinal stationary wall on said bottom plate, an adjustable bar extending longitudinally of said plate for applying lateral pressure to a composite board located between said wall and said bar, a wall at one end of said bottom plate in the form of a yoke, means supporting said adjustable wall to swing to a position affording end-wise access to the space between the stationary wall and said bar, and means for adjusting the second mentioned wall for applying end-wise pressure to said composite board.

4. A matrix comprising a bottom plate, adjustable bars extending longitudinally and medially of said bottom plate, stationary walls on said bottom plate arranged opposite said bars and forming two channels therewith, and means common to the several bars for displacing and retaining said bars in position to apply lateral pressure to composite boards located in said channels, said means including a draught-bar, means for moving the draught-bar longitudinally, said adjustable and draught-bars having inclined recesses therein and balls cooperating with the walls of said recesses to effect lateral displacement of the adjustable bars in dependence upon longitudinal movement of the draught bars.

5. A matrix for producing composite boards comprising a bottom plate, adjustable bars extending longitudinally and medially of said bottom plate, stationary walls on said bottom plate arranged opposite said bars and forming therewith two longitudinally extending channels, and means for retaining said bars in position to apply lateral pressure to composite boards located in said channels.

6. A matrix for producing composite boards as claimed in claim 5, characterized by the provision of an adjusting member arranged between said bars.

7. A matrix for producing composite boards comprising a bottom plate, adjustable bars extending longitudinally and medially of said bottom plate, stationary walls on said bottom plate arranged opposite said bars and forming therewith two longitudinally extending channels, and means common to the several bars for displacing and retaining said bars in position to apply lateral pressure to composite boards located in said channels.

GUSTAF KÄHR.