Jan. 11, 1944. M. M. TEAGUE 2,338,879

VENEER APPARATUS

Filed Aug. 12, 1942 3 Sheets-Sheet 1

FIG. 1

FIG. 2

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Filed Aug. 12, 1942 3 Sheets-Sheet 2

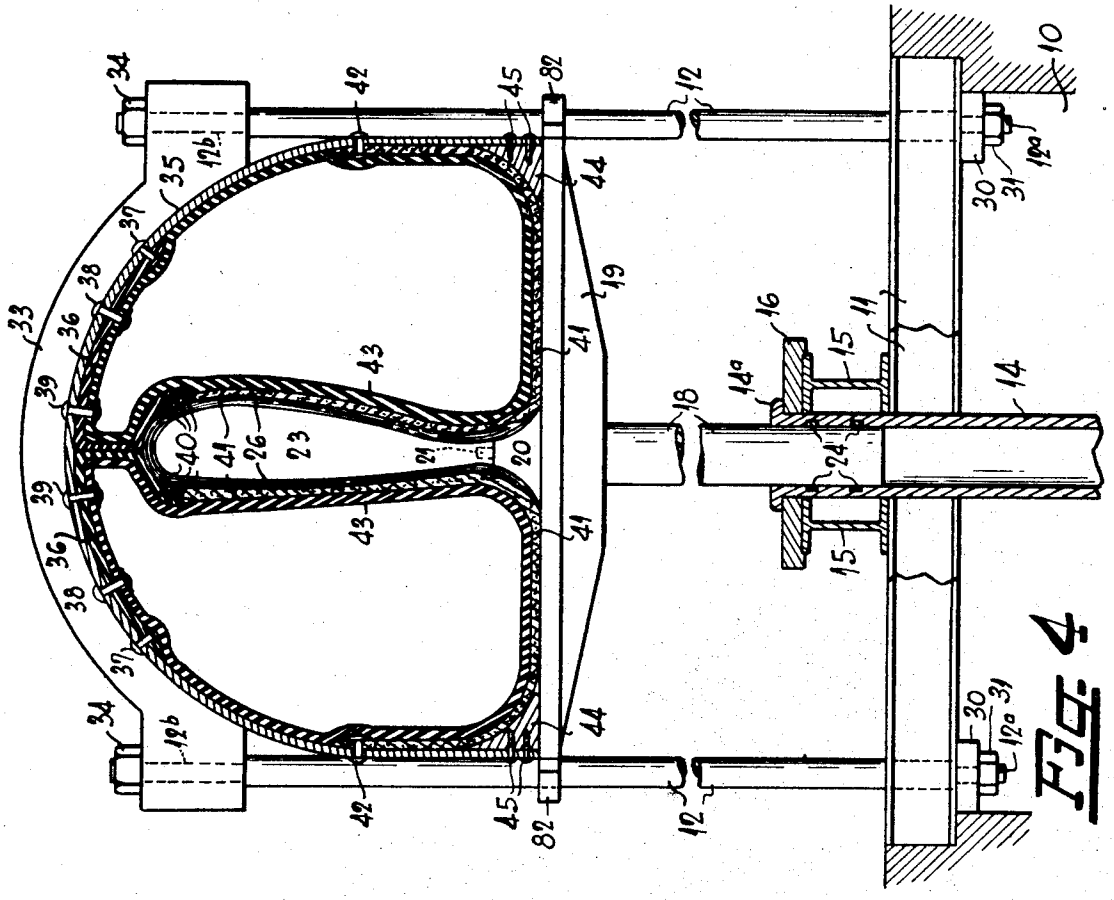


Fig. 4

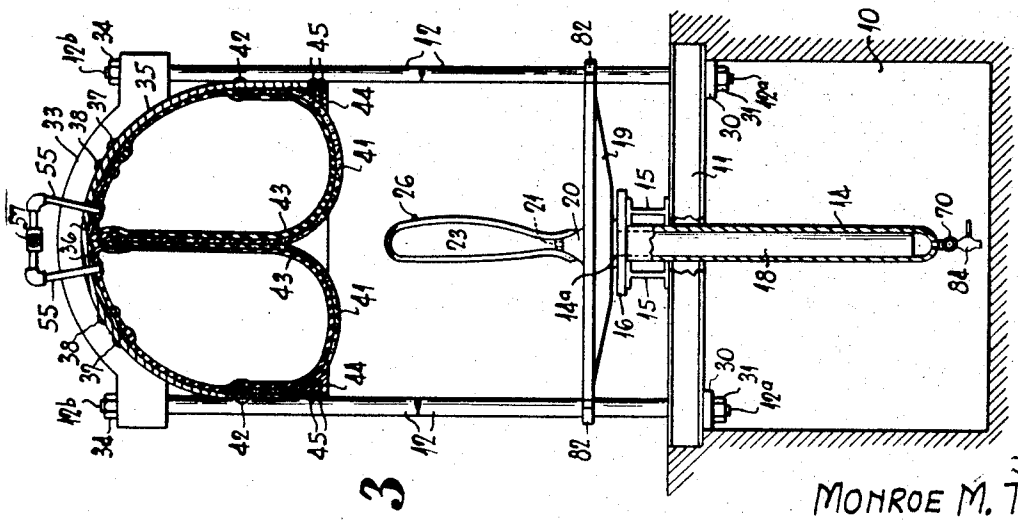


Fig. 3

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Filed Aug. 12, 1942 3 Sheets-Sheet 3

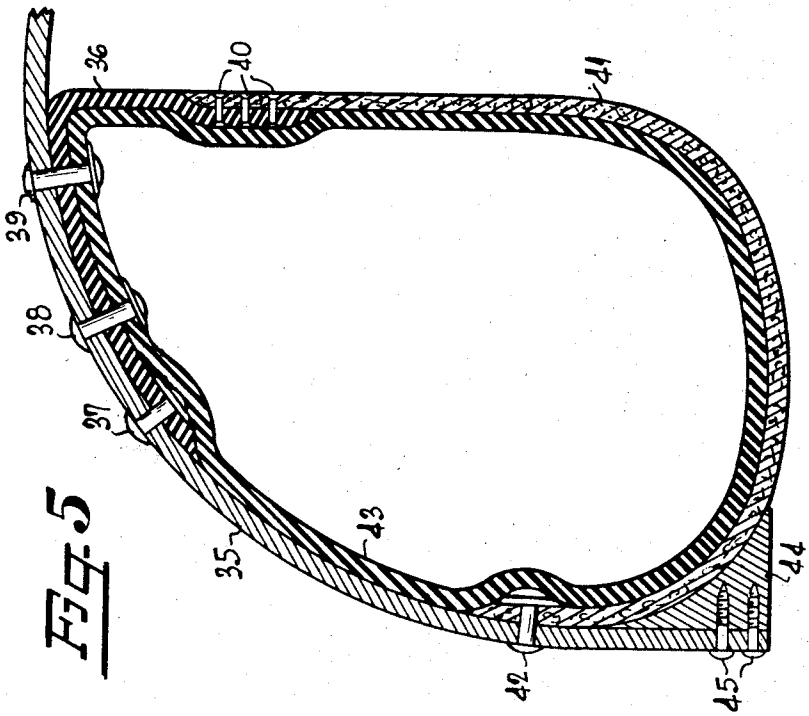


Fig. 5

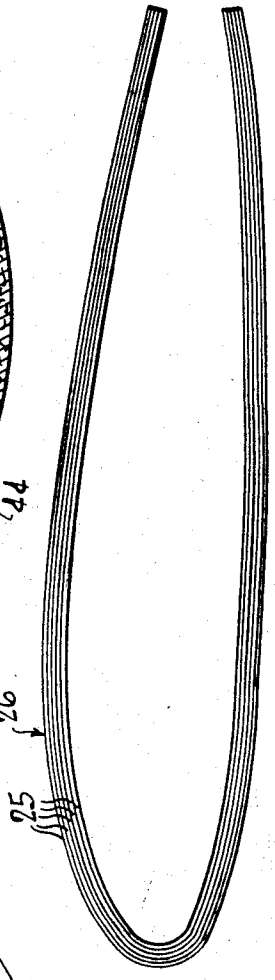


Fig. 8

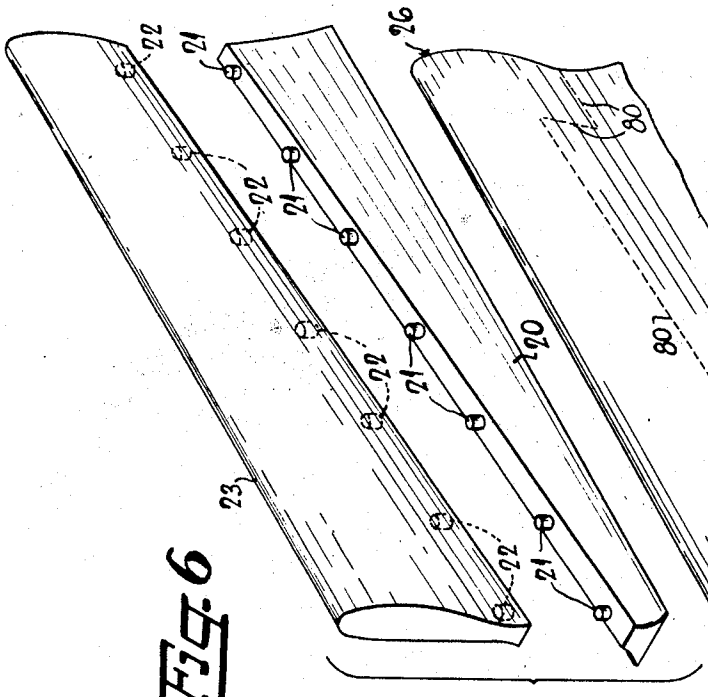


Fig. 6

Fig. 7

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VENEER APPARATUS

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Application August 12, 1942, Serial No. 454,485

4 Claims. (Cl. 144—281)

This invention relates to the art of veneering and more especially to an improved veneer press and method of compressing sheets of material together such as wood on a suitable form to fabricate articles from plywood.

In veneer presses and methods heretofore used, one of the greatest obstacles has been incurred when an attempt has been made to eliminate air pockets between the layers or sheets of veneer material. It is well known in this art that veneering methods usually require a suitable adhesive be applied to the adjoining faces of the veneer material. Then the glue is allowed to partially dry so that when the sheets are placed one upon the other, the glue will be more effective. These assembled sheets are then subjected to a pressure which not only diminishes the thickness of the assembly but also serves to squeeze the excess adhesive from between the layers. Any air between the layers should be removed during this compression, but unless pressure is properly applied to these assembled layers, air pockets will remain in the material and thus materially reduce the effective strength and quality of the finished product.

It is an object of this invention to provide an improved veneer press which is capable of applying a moving pressure applying means to the layers of veneer, beginning at an interior surface area and progressing toward the edges of the layers. In the present instance, a closed flexible bag is inflated to a given pressure. Then the assembled layers of veneer are placed upon a support which, in turn, is moved against this inflated bag until the pressure covers the entire area of the veneer. One of the novel points of the present invention resides in progressively increasing the area of the veneer sheets assembly which is in contact with the inflated bag. In other words, the inflated bag first contacts one portion of the assembled sheets of veneer and then gradually covers the entire outer surface thereof to cause the excess adhesive and air which is disposed between the layers to be squeezed towards the free edges of the veneer layers. If the bag should be moved into contact with the entire outer surface of the veneer assembly at one time, there would be a tendency for the outer edges of the veneer layers to be closed and thus prevent the escape of the air and excess adhesive.

It is another object of this invention to provide an improved method of compressing layers of veneer which comprises the application of a suitable adhesive to the adjoining surfaces of a plurality of veneer sheets, then applying a given low external pressure upon an interior surface area of said layers, and progressively increasing the area covered by said given low pressure towards the outer edges of said layers. After the entire outer surface of the layers of veneer has been subjected to this low pressure, a relatively high pressure is then applied to cause the layers to be further compressed. As heretofore stated, the object of first producing this relatively low pressure is to remove the excess adhesive fluid, as well as to remove the air pockets which might be present between the layers.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings in which—

Figure 1 is an elevation of my improved veneer press;

Figure 2 is a sectional plan view taken along the lines 2—2 in Figure 1;

Figure 3 is a transverse vertical sectional view taken along the lines 3—3 in Figure 1 showing the veneer support in a lowered or retracted position;

Figure 4 is an enlarged transverse vertical sectional view similar to the upper portion of Figure 3, but showing the veneer support and associated layers of veneer in an elevated position where the layers are being compressed;

Figure 5 is an enlarged sectional detail view similar to the upper left-hand portion of Figure 4;

Figure 6 is an isometric exploded view showing one type of support employed in the present apparatus for receiving veneer layers while the same are being compressed;

Figure 7 is an isometric view of a veneer shape such as an airplane wing, which is adapted to be compressed upon the form shown in Figure 6;

Figure 8 is a cross sectional view of the veneer shape shown in Figure 7, said sectional view having been trimmed so as to resemble a portion of an airplane wing.

Referring more particularly to the drawings, the numeral 10 denotes a suitable pit across which a plurality of transversely disposed I-beams 11 are positioned. These I-beams are disposed in pairs, and each pair is spaced apart from each other a sufficient amount to permit vertically disposed rod 12 to fit therebetween. In a similar manner adjacent pairs of I-beams 11 are spaced apart from each other a sufficient distance to permit a cylinder 14 to fit therebetween.

Cylinder 14 projects upwardly above the top

of I-beams 11 and between two longitudinally disposed I-beams 15, said I-beams 15 being supported by the central portions of transverse I-beams 11. A plate 16 is adapted to rest upon the top of I-beams 15, and is also adapted to surround the upper projecting end of cylinder 14. By observing Figure 4, it will be seen that the upper portion of the cylinder 14 has an out-turned lip 14a, which lip rests on the top of a plate member 16 to thereby support the cylinder 14.

Each cylinder 14 has slidably mounted therein a piston 18, and the upper end of the piston 18 supports a platform 19 which, in turn, has secured to the upper side thereof a veneer support base 20. This base is more clearly shown in Figure 6. Suitable projections 21 extend from the upper side of the base 20, said projections being adapted to removably fit in cavities 22 disposed in a veneer supporting form 23.

The shape of member 20 and 23 may be varied to suit the particular item which is being made. For example, the present shape is best suited to the manufacture of veneer airplane wings. It is, of course, understood that if other portions of the airplane are desired to be made, the shape of the members 20 and 23 would have to be changed accordingly. In fact, any type of veneer structure may be compressed by employing the present invention, but the present disclosure is especially adapted to veneer construction in which a rounded concave or convex edge is present.

In order to prevent the pressure within the lower portion of cylinder 14 from escaping around the piston 18, suitable packing rings 24 are provided (see Figure 4). These rings may be of felt, fiber, or other suitable material capable of providing a liquid tight seal between the piston and cylinder.

The above mechanism relates to the veneer support and the actuating means therefor. In actual operation the veneer layers 25 are placed upon the support 23 and then are moved upwardly between suitable resilient pressure members to thereby cause the layers to be firmly pressed together into a unitary structure such as an airplane wing 26. The pressure member and associated structure will now be described.

These pressure members are supported by the vertically disposed rods 12 previously described. By referring to Figures 1, 3, and 4, it can be seen that the lower ends of each rod 12 has a restricted threaded portion 12a integral therewith which penetrates a plate 30, said plate being secured to the bottom of each pair of I-beams 11. A nut 31 is threadably secured on the projecting lower end 12a of each rod 12 so that the rod will be held in erected position. The upper end of each rod 12 has another restricted threaded portion 12b which penetrates the end of a yoke member 33, said yoke member being supported by a pair of rods 12 which are disposed on opposed sides of the veneer supporting member 23. A nut 34 is provided on the upper end of restricted thread portion 12b for securing the yoke in position. In the present disclosure there are six pairs of rods 12 and each pair supports a yoke 33; however, it is to be understood that any number of pairs of rods and yokes may be employed to suit the type of structure to be built, without departing from the spirit of the invention.

These yokes are all disposed substantially at the same elevation and the lower sides thereof have secured thereto a hood 35, said hood having a lower open side which is disposed opposite the platform 19 and veneer support 23. Secured to the interior of hood 35 is a pair of resilient sheets of material 36, such as rubber, by any suitable means such as bolts 37, 38, and 39. Each of these sheets is identical, but it is to be understood that they may vary under certain conditions, especially where the form or shape of the veneer material is irregular and unsymmetrical. One edge of each sheet 36 has secured thereto as at 40 a wear sheet 41, which is preferably made out of a suitable tough material such as leather. These sheets extend downwardly alongside each other from points 40 for a considerable distance, and then extend laterally in opposite directions to the sides of hood member 35. The sheets 41 are secured as at 42 to the interior surface of the hood member 35.

By observing Figure 5, it can be seen that the rubber sheets 36, the wearing sheet 41, and a portion of the hood member 35 form a closed figure. Disposed in this closed figure is a closed bag 43 which is preferably made of a suitable resilient material such as rubber. The purpose of this bag is to hold air of a sufficient pressure to compress the layers of veneer 25 together when the apparatus is in operation. The upper end of this bag 43 is secured to the hood member 35 by means of bolts 38 and 39.

In order to prevent abrupt bends in the bags 43 and also to prevent similar bends in the wearing sheets 41, suitable blocks 44 are secured to opposed edges of the hood member 35 along the open side thereof by any suitable means such as screws 45.

Air is admitted to each of the closed bags 43 by way of pipes 49 (see Figures 1 and 2). These pipes lead to a suitable pressure tank 50 which is adapted to contain compressed air or the like. Although compressed air has been specified, it is to be understood that any suitable fluid may be employed for this purpose such as steam or the like. Suitable hand valves 51 and 52 are located in pipe lines 49 so as to control the flow of air from the tank 50 to the closed bags 43. These air pipes also have an exhaust hand valve 53 which may be employed for relieving the pressure from the bags 43, when desired, after valve 52 has been closed.

By observing Figures 1 and 3, it can be seen that each bag 43 has leading therefrom a pipe 55, said pipe having a safety valve mounted at the end thereof, which, in the present instance, relieves pressure in the bags when the same has reached 100 pounds. Another pipe 57 leads from the pipe 55 and this pipe has a conventional pressure gauge 58 communicating therewith. Also the pipe 57 has a hand valve 59 and a safety valve 60 communicating therewith, said safety valve 60 being adapted to relieve the pressure in pipe 57, as well as in bag 43 when it reached a pressure limit substantially lower than the pressure adapted to actuate safety valve 58. Usually the safety valve 60 is set at an exhaust point of about 10 pounds.

The purpose of the hand valve 59 is to cut off the pressure from the safety valve 60 at the desired time. For example, it is desirable to have a relatively low pressure, say 10 pounds in the flexible bags 53 when the form 23 and associated veneer structure 26 is first inserted therebetween. After the form 23 and structure 26 become completely inserted to the position shown in Figure 4, the hand valve 59 is actuated to cut off the safety valve 60, after which the pressure in the tank 50 builds up the pressure in the flexible bags

until approximately 100 pounds is reached. At this time, the safety valve 56 operates.

The pressure tank 50 has conventional gauge 66 communicating therewith to indicate the pressure in the tank. Also leading from the tank 50 is a pipe 68 which connects the tank to a conventional automatic pump 67. This pump is so equipped that it will maintain a predetermined pressure in the tank 50. For example, when the valve 56 is set at 100 pounds exhaust, it may be desirable to have the pressure in the tank 50 maintained at a slightly higher level.

Another pressure tank 61 is employed for raising members 18, 19, 20, and 23 when it is desired to insert the form and the associated layers of veneer between the flexible bag members 43. The tank 61 communicates with the interior of cylinders 14 by means of a pipe 70, said pipe having hand valve 71 therein and said tank having a pressure gauge 73 associated therewith. A safety valve 74 also communicates with the tank 61 and the associated structure so that when a predetermined high pressure is reached, the air will be relieved. It can be seen by observing the left-hand portion of Figure 1 that an exhaust outlet 75 is provided and this outlet is controlled by a hand valve 76.

The tank 61 has a suitable air pressure maintained therein, say 125 pounds, by any suitable means such as an automatic pump 62, said pump communicating with tank 61 by way of pipe 63.

As heretofore stated, when beginning to use this apparatus, the hand valves 51 and 52 are opened to allow the bags 43 to become inflated to approximately 10 pounds pressure. At the same time the hand valve 59 is opened to permit the 10 pounds pressure gauge 60 to be subjected to the pressure within the bags. This initial 10 pounds of pressure in the bags 43 will cause the wearing sheets 41 to press against each other in the manner shown in Figure 3 and the pressure between these sheets 41 will be sufficient to yieldingly engage the opposed sides of the veneer layers 25 which are disposed upon the form 23. Then the air is admitted to the lower portion of cylinders 14 under a suitable pressure of approximately 125 pounds; thereby causing the pistons 18 and the associated platform 19 to rise upwardly. This upward movement will cause the form 23 and the associated veneer layers 25 to become inserted between the sheets 41 and, of course, as it is inserted, the layers will be subjected to the predetermined low pressure of approximately 10 pounds. As the form 23 and the veneer structure are inserted, the 10 pounds pressure area is gradually increased from the upper portion of the form to the lower portion of the form until the entire outer surface of the veneer is covered. The progressive ironing or covering of the veneer structure by the pressure members 41 and 43 serves to remove air pockets from between the veneer layers and also serves to remove the excess glue or other adhesive therefrom.

By doubling the veneer layers 26 over the form 23, the top of the form serves as an anchor for the central portion of the sheets, thus leaving the lower edges of the sheets free to extend downwardly while pressure is progressively applied from top to bottom.

After the form 23 and veneer structure have been completely inserted, the hand valve 59 is closed to permit the pressure to be increased in the bags 43 up to a higher pressure, say 100 pounds, at which time the safety valve 56 will be actuated to relieve any excess pressure. Before the high pressure is admitted to bags 43, the pressure in cylinder 14 has elevated the form and veneer structure to a completely inserted position as shown and then the high pressure is applied. After the veneer layers have been subjected to the high 100 pounds pressure for the desired length of time, the valve 52 is closed and valves 51 and 53 are opened to permit the pressure in the bags 43 to be relieved. Then, the valve 71 may be closed and the exhaust valve 76 opened to permit the air in cylinders 14 to exhaust and thus permit the platform 19, together with members 20, 23, and 26, to move downwardly from between the members 41 and 43.

When the platform and compressed layers of the veneer have been lowered to the position shown in Figure 1, the member 23 and the compressed veneer layers 26 are removed from base member 20 and then the form is separated from the compressed veneer layers.

In Figure 7, the compressed layer structure of veneer is shown as it appears when it is removed from the form 23. This compressed shape is made especially for airplane wings, but before it is ready for use, it is necessary to cut the same in a suitable manner such as along dotted lines 80, after which suitable spars and truss work, if necessary are placed therein and secured in position so as to make the compressed shape more substantial and ready for use. The cutting along the lines 80 is to provide a space for an aileron or flap.

The upward movement of the platform 19 is additionally guided by suitable brackets 82, secured to platform 19, said brackets encircling some of the vertically disposed rods 12. These brackets merely assist the pistons 18 in causing the platform 19 to move upwardly along a predetermined path whereby the form 23 and associated veneer structure 26 will be held in the proper position as they are inserted between the bags 41 and 43.

Throughout the specification, it is stated that a pressure of 10 pounds is placed in the bags at first and then 100 pounds pressure is admitted to the bags and 125 pounds pressure is admitted to the cylinders. These pressures are given only by way of illustration, as it is quite evident that any suitable pressure above or below 10 pounds may be initially placed in the bags, and that the working pressure can be varied very much below or very much above 100 pounds to suit conditions, and it is desirable to have the pressure in the cylinder 14 somewhat higher than that within the bags, so as to hold the object being molded in its raised position.

Sometines it is desirable to employ a heated fluid instead of steam in the bags 43 to effect the proper consolidation of the veneer layers. In such a case a steam inlet pipe 83 is provided in which a hand valve 81 is located. When using steam, the valve 52 is closed and the valve 81 is opened so that steam instead of air will flow into bags 43.

It will be noted by observing Figures 1 and 3 that drain valves 84 are located in the bottoms of cylinders 14. These drain valves facilitate the removal of liquid matter from the cylinders and pipe 70.

In the drawings and specification, there has been set forth a preferred embodiment of the invention, and although specific terms are em-

ployed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. In a veneer press, a fixed frame, a vertically movable platform disposed in the frame, an uprising form on the upper side of the platform, and adapted to have folded over its upper edge and side portions a plurality of veneer sheets having their surfaces coated with an adhesive, an open bottomed chamber disposed in fixed position above the platform, and having top and side walls and end walls, a pair of inflatable and distendable bags secured to the inside surfaces of said member, and having their proximate faces adapted to be distended towards each other by air pressure on the interior thereof, means for forcing fluid into the bags to distend the same, a safety valve for regulating the pressure therein, so that it will not exceed a predetermined low point, means for forcing the platform and the form with the veneer sheets thereon upwardly between the proximate surfaces of the two bags to cause the form to be progressively inserted between the bags, a second safety valve for setting the high point of pressure, means for disconnecting the first safety valve to substantially increase the pressure in the bags after the form has been fully inserted therebetween to thus apply greater pressure to the veneer sheets to bond them together.

2. In a veneer press, a fixed frame, a vertically movable platform disposed in the frame, an uprising form on the upper side of the platform, and adapted to have folded over its upper edge and side portions a plurality of veneer sheets having their surfaces coated with an adhesive, an open bottomed chamber disposed in fixed position above the platform, and having top and side walls and end walls, a pair of inflatable and distendable bags secured to the inside surfaces of said chamber, and having their proximate faces adapted to be distended towards each other by air pressure on the interior thereof, means for forcing fluid into the bags to distend the same, a safety valve for regulating the pressure therein, so that it will not exceed a predetermined low point, means for forcing the platform and the form with the veneer sheets thereon upwardly between the proximate surfaces of the two bags to cause the form to be progressively inserted between the bags, a second safety valve for setting the high point of pressure, means for disconnecting the first safety valve to substantially increase the pressure in the bags after the form has been fully inserted therebetween to thus apply greater pressure to the veneer sheets to bond them together, the bags having a wear resistant sheet secured over their proximate surfaces to engage the veneer sheets inserted therebetween.

3. In a veneer press, a fixed frame, a vertically movable platform disposed in the frame, an uprising form on the upper side of the platform, and adapted to have folded over its upper edge and side portions a plurality of veneer sheets having their surfaces coated with an adhesive, an open bottomed chamber disposed in fixed position above the platform, and having top and side walls and end walls, a pair of inflatable and distendable bags secured to the inside surfaces of said chamber, and having their proximate faces adapted to be distended towards each other by air pressure on the interior thereof, means for forcing fluid into the bags to distend the same, a safety valve for regulating the pressure therein, so that it will not exceed a predetermined low point, means for forcing the platform and the form with the veneer sheets thereon upwardly between the proximate surfaces of the two bags to cause the form to be progressively inserted between the bags, a second safety valve for setting the high point of pressure, means for disconnecting the first safety valve to substantially increase the pressure in the bags after the form has been fully inserted therebetween to thus apply greater pressure to the veneer sheets to bond them together, the pressure regulating mechanism comprising two safety valves with means for disconnecting the high pressure safety valve and connecting the low pressure safety valve while the form with the veneer sheets thereon is being inserted between the bags, and means for disconnecting the low pressure safety valve and connecting a high pressure safety valve to the interior of the two bags, so that pressure may be substantially increased after the form with the veneer sheets thereon has been inserted between the bags.

4. In a veneer press, a framework, a plurality of vertically disposed posts rising from each side of the framework, a platform mounted for sliding movement on said posts, and having a form projecting upwardly from the upper surface thereof, and onto which adhesively coated veneer sheets are adapted to be placed, a piston extending downwardly from the platform and pressure operated means disposed below the piston for raising the platform upwardly, an inverted open bottomed hood fixedly mounted on said posts above said platform, and having a pair of inflatable and distendable bags secured therein whose proximate surfaces tend to press against each other when air pressure is admitted into the bags, so that when the platform is moved upwardly, the form with the adhesively coated veneer sheets thereon will be progressively moved between the proximate surfaces of the bags while a comparatively low pressure is within the bags, and means for substantially increasing the pressure in the bags after the form with the veneer sheets thereon has been completely inserted between the proximate surfaces of the bags.

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