

3 Sheets—Sheet 1.

APPARATUS FOR MANUFACTURING DOORS, &c.

Patented Nov. 10, 1896.



INVENTOR

W. W. Grier
by his Attorneys
W. Baxendell & Sons

(No Model.)

3 Sheets—Sheet 2.

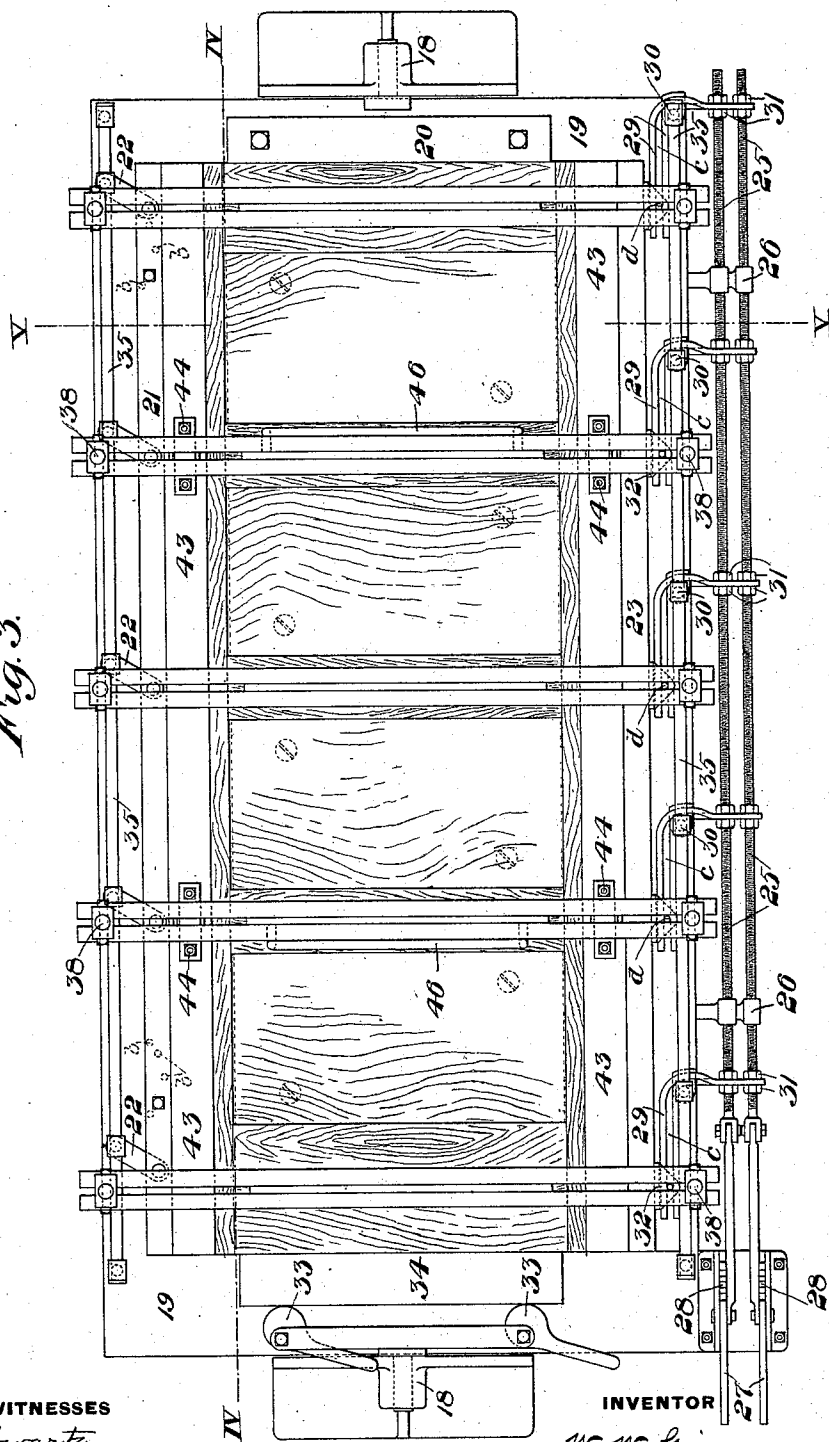
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Fig. 3.



WITNESSES

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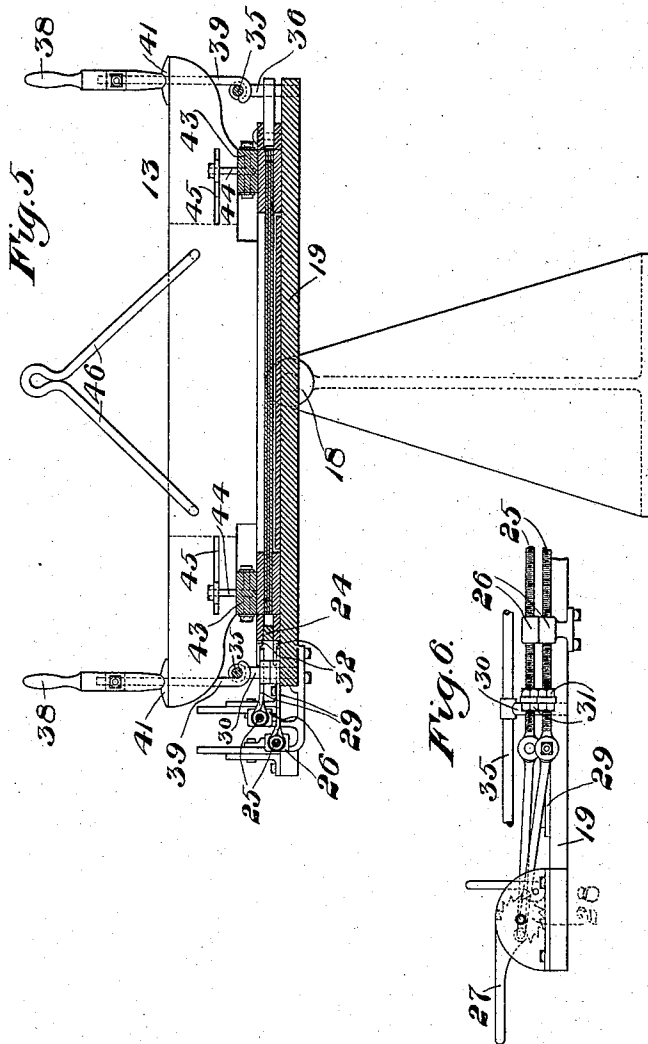
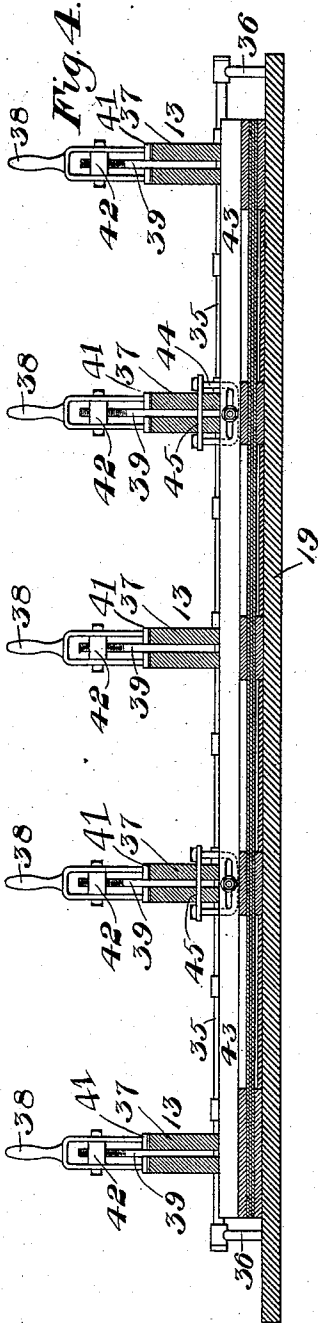
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UNITED STATES PATENT OFFICE.

WILLIAM W. GRIER, OF HULTON, PENNSYLVANIA.

APPARATUS FOR MANUFACTURING DOORS, &c.

SPECIFICATION forming part of Letters Patent No. 570,992, dated November 10, 1896.

Application filed August 5, 1893. Serial No. 482,428. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. GRIER, of Hulton, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for the Manufacture of Doors, &c., of which the following is a full, clear, and exact description.

I shall describe my improvement with reference to the accompanying drawings, in which—

Figure 1 is a cross-sectional view through a building containing apparatus embodying my invention. Fig. 2 is a horizontal cross-section on the line II II of Fig. 1. The other figures are on a larger scale. Fig. 3 shows in plan view one of the tables with a door clamped thereto. Fig. 4 is a vertical longitudinal section on the line IV IV of Fig. 3. Fig. 5 is a vertical cross-section on the line V V thereof, and Fig. 6 is a detail view showing parts of the apparatus in side elevation.

The object of my invention is to provide means for the rapid assembling and gluing together of the parts of doors, shutters, &c.

In Figs. 1 and 2 of the drawings, 2 represents an inclosure or building containing the apparatus, and 3 represents a revolving shed or frame contained within the building and supported by a rotary post 4, which is revolvable, so as to turn the shed around on its vertical axis. Around this shed is a circular series of tables 5, on which the doors are assembled and glued, and extending around said series of tables is a railway-track 6, having branches 7, leading outside the building and preferably provided with a turn-table or switch 8, adapting the cars to be shunted upon a track 9, from whence they may be introduced into the shed. The shed is adapted to contain the lumber to be made into doors, &c., and is provided with suitable glue-rolls 10, which may be driven by belt connections 11 from a driving-shaft 12. The shed also carries one or more clamp-suspending ropes or chains 13, upheld by a counterweight or weights 14, and adapted to be attached to clamps 13 upon the tables 5 as they are brought opposite thereto by revolution of the shed. For the purpose of heating the lumber used in making the doors, &c., I employ a steam-pipe 15, which leads into the central post 4 and thus heats the room of the shed in

which the lumber is kept. 16 is a porch or open portion at the periphery of the shed where the workman stands for the purpose of gluing and clamping the parts of the doors.

The general operation of the apparatus is as follows: The shed having been charged with lumber by means of the car 17, the workman standing at the porch 16, having glued the proper parts of the door, lays them upon one of the tables in front of the porch, clamps them together by the clamp 13, (one of these clamps being upon each table and having been first raised to permit the door parts to be assembled,) releases the clamp-suspending device from the clamp and upholds the counterbalance by a suitable lever or other device, turns the shed so as to bring the clamp-suspending device opposite to a second table, lifts the clamp therefrom, lays upon the table the parts of a door, and clamps them upon it after lowering the clamp, and thus proceeds, turning the shed successively and making a door on each table as the clamp-suspending device is brought opposite thereto. When doors have thus been assembled and glued on all the tables, they will have remained with their parts clamped together long enough to have become sufficiently set to be moved with safety, so that thereafter, before building a second door on each of the series of tables, the workman releases the clamp, removes the previous door and puts it on the car 17, which is moved along the track until it has been loaded and is ready to be taken from the building. By this mechanism I am enabled to carry on the manufacture of the doors very rapidly and to make them perfectly level and symmetrical and much more uniform and regular in size than is possible with other apparatus.

The part of the mechanism which I claim herein as my invention consists in a new form of clamping device, which is shown in detail on the second and third sheets of the drawings and which I shall now proceed to describe.

In Fig. 3 I show the table and clamping device alone, and in Figs. 4 and 5 I show the same with a door thereon in process of manufacture. The table, as shown in Fig. 3, is preferably supported by end trunnions 18, enabling it to be tilted from a horizontal to

a vertical position. Each table has a level bed-plate 19, on which the parts of the door are laid, an end rail 20, against which the end parts of the door abut, and a laterally-adjustable side bar 21, secured to swinging links 22, permitting it to be shifted laterally into different positions, in which it can be fixed by pins fitting in holes *b*. On the side of the table opposite the bar 21 is a bar 23, preferably composed of two horizontal parallel strips somewhat separated vertically from each other by an intermediate fixed strip 24. I separate these strips, so that they shall not bear upon the middle of the door's edge, for doors made as described in the application below mentioned have at the edge a longitudinal middle filling-strip, against which it is not desirable to exert pressure. These strips are adapted to be forced inwardly against the edge of a door, which is interposed between them and the opposite bar 21, by mechanism the preferable construction of which is shown in Figs. 3, 5, and 6.

25 25 are parallel rods which extend along the side of the table and are longitudinally movable in guides 26. Each rod is connected at its end to a lever 27, enabling it to be moved lengthwise forcibly, and the lever has an adjustable ratchet 28 or other locking device. At intervals along the table are pairs of elbow-levers 29, set one above the other, having pivotal bearings against posts 30. The levers of each pair are connected, respectively, to longitudinally-adjustable nuts 31 on the rods 25, and the inner ends of the levers carry clamping-shoes 32, which bear, respectively, against the upper and lower side strips of the bar 23. Each lever is preferably forked, so as to afford a longitudinal slot *c*. The clamping-shoe is held to the lever by a pin *d*, which fits in said slot and permits its longitudinal adjustment on the lever. A convenient construction of the levers is to make them of steel rods bent double into the desired angled form, so as to afford the slot *c*. The resiliency of the steel gives a spring action to the levers and causes them to act yieldingly against the edge of the door. If now the rods 25 are moved longitudinally by means of the hand-levers 27, the series of levers 29 will be turned on their pivots and will press the clamping-shoes 32 inwardly against the edge of the door to be clamped and force the door against the bar 21 with a force corresponding to that exerted upon the hand-levers. Convenient adjustment of the device may be made by moving the nuts 31 on the rods 25 and by adjusting the shoes 32 lengthwise in the slots. While the use of these levers is desirable and is claimed herein specifically, the invention, as stated in the broader claims, is not limited thereto, since suitable cams or screws may be substituted for the levers.

Cams 33 are arranged at the end of the table, and are adapted to force a movable rail

34 against the end of the door and to press it against the bar 20 at the other end of the table. The levers, cams, and bars above described provide means for the horizontal or edgewise clamping of the door, all this mechanism forming a permanent part of each table.

In order to provide for the vertical clamping of the door, I provide the table with elevated clamping-rods 35, adapted to coact with vertical pressure devices or clamps and held firmly to the table by the anchor-bolts 36, through eyes of which the bars pass. The transverse pressure devices 37 are each composed, preferably, of two parallel separated pieces set edgewise and having levers 38, provided with hook-rods 39, adapted to engage with the rods 35 at their hook ends, and provided with bearing-surfaces adapted to engage cam-surfaces 41 at the top of the pressure devices, so that on turning the levers their engagement with the cam-surfaces will cause them to bear down forcibly thereon. The rods 39 preferably pass through nuts 42, enabling them to be adjusted longitudinally to suit doors of different thickness. On the under side of the transverse pressure devices at the ends thereof are longitudinal stile-bars 43, which extend from end to end of the table and are connected to two or more of the transverse clamps by means of clevises 44, secured to the clamp in slots 45, enabling the strips to be adjusted laterally on the clamps to suit doors of various widths. Two or more of the clamps are provided with bails or hangers 46, as shown in Fig. 1, enabling them to be lifted by the suspending devices 13', as above described.

The operation is as follows: The pieces of the door having been suitably coated with glue are assembled in position on the bed 19 of the table and are clamped horizontally by means of the levers, cams, and bars above described, and then by means of the transverse clamps, which have been lowered upon the door and the hooks 39, which have been engaged with the rods 35, a forcible down pressure of the stile-bars 43 upon the stiles of the door and of the middle portions of the transverse pressure devices upon the cross-rails is secured. These transverse clamps are sufficiently elastic to yield somewhat to the forcible pressure and to press evenly upon the parts of the door.

The whole operation of clamping the door in place may be performed very rapidly, and the work is accomplished efficiently.

The apparatus is especially adapted to the manufacture of doors the parts of which are glued together, as described in a prior patent application, Serial No. 465,291, filed by myself and C. J. Matthewson; but the invention is not limited thereto, since it may be used in the manufacture of doors, shutters, window-scutting, &c., differently constructed.

Within the scope of my invention as defined in the claims modifications in the form and arrangement of the parts may be made,

since I believe I am the first to use in the manufacture of doors, &c., clamps which press upon and clamp the sides and edges of the door.

5 I claim—

1. The combination with a table, of longitudinal stile-bars thereon, transverse pressure devices resting upon and arranged to press down said bars, and blocks arranged to press upon the door between the stile-bars and contacting with the pressure devices; substantially as described.

2. The combination with a table, of longitudinal stile-bars thereon, transverse pressure devices bearing upon and longitudinally adjustable along said bars, and blocks arranged to press upon the door between the stile-bars and acted upon by the pressure devices; substantially as described.

3. The combination with a table, of longitudinal stile-bars thereon, transverse pressure devices resting upon and arranged to press down said bars, and blocks secured to the pressure devices and arranged to press upon the door between the stile-bars; substantially as described.

4. The combination with a table or bed, of pressure devices acting at right angles thereto to press the assembled parts against the bed, and other pressure devices arranged to act against both the side and end edges and force the parts together laterally; substantially as described.

5. The combination with a table or bed, of longitudinal stile-bars thereon transverse clamping-bars resting upon and longitudi-

nally adjustable along the stile-bars and arranged to press the door down upon the table, and depending clamping-levers bearing on these bars and having their lower ends engaging the table; substantially as described.

6. The combination with a table, of longitudinal stile-bars thereon, transverse clamps adjustable longitudinally upon the stile-bars, and clamping-levers bearing upon the transverse clamps and having depending hooked ends arranged to engage longitudinal rods secured to the table; substantially as described.

7. The combination with a table, of longitudinal stile-bars thereon, transverse clamps adjustable longitudinally upon the stile-bars, laterally-acting side and end clamps for the article, and clamping-levers bearing upon the transverse clamps and having depending hooked ends arranged to engage longitudinal rods secured to the table; substantially as described.

8. The combination with a table or bed, of pressure devices acting at right angles thereto to press the assembled parts against the bed, and other pressure devices arranged to act against both the side and end edges, the side pressure devices having separated bearings upon different portions of the edge of the article; substantially as described.

In testimony whereof I have hereunto set my hand.

WILLIAM W. GRIER.

Witnesses:

W. B. CORWIN,
THOMAS W. BAKEWELL.