(No Model.) 3 Sheets—Sheet 1.

A. E. PRESTON.

APPARATUS FOR AND METHOD OF GAINING WOOD FOR SEATS AND BACKS.

No. 476,305. Patented June 7, 1892.

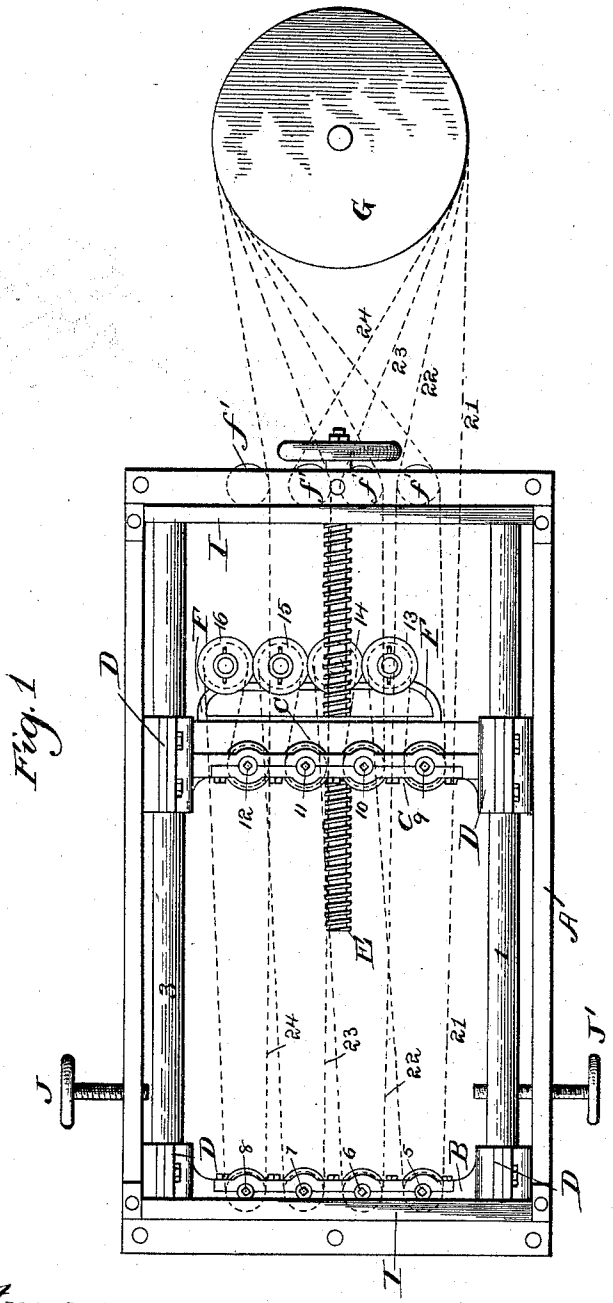

Fig. 1.

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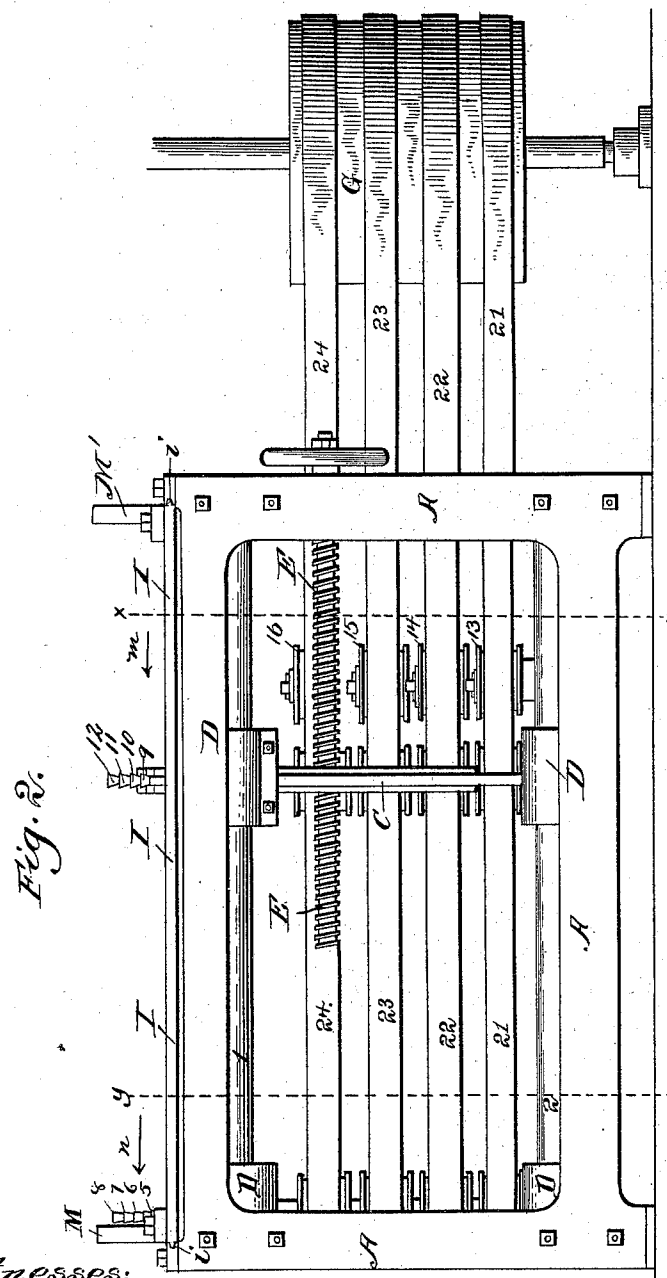

Fig. 2.

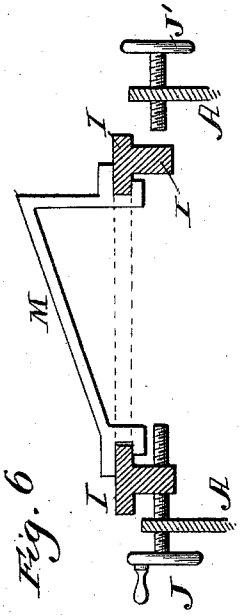

Fig. 6

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(No Model.) 3 Sheets—Sheet 3.

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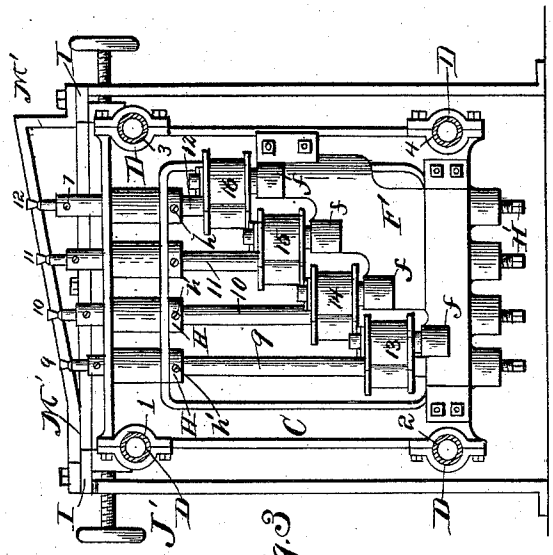

Fig. 3.

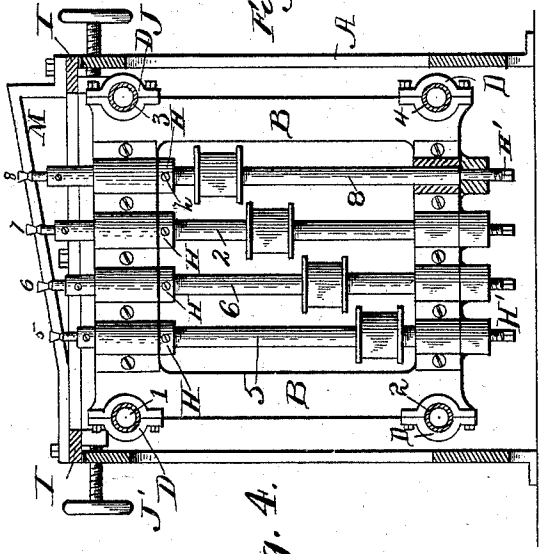

Fig. 4.

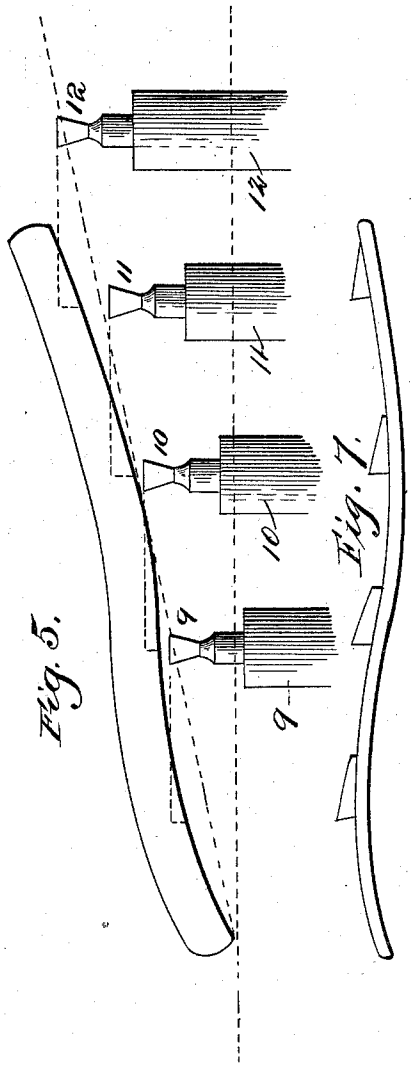

Fig. 5.

Fig. 7.

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UNITED STATES PATENT OFFICE.

ALMON E. PRESTON, OF BATTLE CREEK, MICHIGAN.

APPARATUS FOR AND METHOD OF GAINING WOOD FOR SEATS AND BACKS.

SPECIFICATION forming part of Letters Patent No. 476,305, dated June 7, 1892.

Application filed October 19, 1891. Serial No. 409,203. (No model.)

To all whom it may concern:

Be it known that I, ALMON E. PRESTON, a citizen of the United States, and a resident of Battle Creek, in the county of Calhoun and State of Michigan, have invented certain new and useful Improvements in Apparatus for and Methods of Gaining Wood for Seats and Backs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to a machine for and process of cutting gains in wood, especially useful in hard woods having either a straight surface or an irregular compound curvature adapted for the seats and backs of desks and to be fastened to iron standards.

The object of the invention is to produce a seat or back provided with a series of parallel gains at both ends thereof, which incline inwardly from one end to the other, at a single operation and with one handling of the lumber, with the least possible amount of cutting, which is effected in a straight line, and consequently with much less wear on the routers, the gains being designed to receive dovetail lugs on iron standards in a manner to effect the rigid fastening of the parts together and of enabling the fastening to be tightened up should the seat or back work loose.

With these ends in view the invention consists, first, in the method of producing a seat or back adapted for iron standards, which consists in cutting a series of inclined parallel gains therein, effected by holding the wood at an angle to the line of movement or feed of the carriage and then moving or feeding the work in a straight line and for a suitable distance to the routers or cutters, whereby all the gains are cut at one time and with uniformity in the length and depth of the cuts, thus saving repeated handling of the work, much wear on the routers and parts of the machine, and the economical and expeditious production of the work.

The invention further consists in the mechanism for carrying the process into effect, which consists in the combination of two sets of vertical spindles, each having a router or cutter, and one set of spindles being stationary and the other set movable or adjustable relatively to the stationary set, a series of driving-belts, each of which is common to a spindle of each set of spindles and all the belts driven from a common driving-drum, and a carriage adapted to carry the work on a vertically-inclined bed and arranged to be moved in a straight line relatively to the machine-frame and the cutter-spindles, all as will be hereinafter fully described and claimed.

In the accompanying drawings, which illustrate my improved machine and the manner of cutting a back or seat, Figure 1 is a plan view of the machine. Fig. 2 is a side elevation of the machine. Fig. 3 is a vertical transverse sectional view through the machine on the plane indicated by the dotted line $x\,x$ of Fig. 2, looking in the direction indicated by the arrow m and showing the movable cutter-frame. Fig. 4 is a similar sectional view on the plane indicated by the dotted line $y\,y$ of Fig. 2, looking in the direction indicated by the arrow n and showing the stationary cutter-frame. Fig. 5 is an enlarged detail view showing one series of cutters, which vary in height, and the work on which the cutters are designed to operate, the work being shown in edge view and the dotted lines indicating the gains to be cut in the work by the cutters. Fig. 6 is a view, partly in section and partly in elevation, a part of the sliding frame 1 being shown in section and one of the work-holding brackets being shown in side or edge view, also the means for limiting the movement of the sliding frame. Fig. 7 is an edge view of the slat-iron to which the back or seat is adapted to be applied, this invention being especially designed to form gains in a back or seat to receive the projections on the slat-iron.

Like numerals and letters of reference denote corresponding parts in all the figures of the drawings.

I will first proceed to a detailed description of the construction and arrangement of mechanisms comprising the machine which is especially adapted for carrying the improved process into effect.

In the drawings, A designates the machine-frame, which may be of any construction usual or common to woodworking machinery, and

within the sides and at the top and bottom of this frame are arranged the longitudinal bearing-rods 1 2 3 4, the rods or bars 1 2 being arranged on one side of the machine and the other rods or bars being on the other side of the frame. These bars or rods extend from end to end of the machine-frame and are rigidly secured thereto, and on said bars or rods are supported two auxiliary frames B C for carrying the two series of cutter-spindles. One frame B is held in a rigid or stationary position on the bearing-bars, while the other frame C is arranged to slide or move back and forth on the bearing-bars relatively to the other stationary frame. Each auxiliary vertical cutter-frame is provided with sleeve-bearings D, which are "babbitted" around the bearing-bars, the bearings D of the stationary frame B being rigidly fastened to said bars, while the bearings of the movable cutter-frame C are loose on the bearing-bars to permit said movable cutter-frame to be operated by a feed-screw E, which passes through the end of the machine-frame (at the right-hand end) and is boxed in the movable cutter-frame C to be moved or adjusted within the limits of the feed-screw E.

The stationary cutter-frame B carries a series of vertical cutter-spindles 5 6 7 8, any desired number of which may be used, according to the number of gains to be cut in one end of a seat or back, and the other movable cutter-frame C likewise carries a series of cutter-spindles 9 10 11 12, which correspond in number to the spindles of the frame B, the two series of spindles being in line in the direction of length of the machine, (see Fig. 1,) the cutters being preferably of the "dovetail" variety, as shown.

The movable cutter-frame C carries a bracket F, which is arranged to project to one side of the spindles in said frame, and in this bracket is a series of bearings *f*, in which are journaled the shafts of the idle-pulleys 13 14 15 16, said pulleys being arranged in planes between the cutter-spindles, as shown more clearly in Fig. 1.

In advance of the idler-pulleys and suitably supported on the machine-frame A is a series of guide-pulleys *f'*, which are in line with the pulleys on the spindles supported on the movable frame C. A series of endless belts are operated from a common driving-drum G, which has its shaft suitably journaled in bearings on the machine-frame, and these belts are arranged as follows: The driving-belt for the spindles 5 9 passes directly to and around the spindle 5 to the idler 13, thence to and around the pulley on the spindle 9, and then back to the drum. The belt 22 passes between spindles 9 10 to the spindle 6, thence to and around the idler 14, thence to the spindle 10, and then to the driving-pulley. The belt 23 passes around the spindle 7, the idler 15, and the spindle 11 to the driving-pulley, and the last belt 24 passes to and around the spindle 8, idler 16, and spindle 12, and thence to the driving-drum. It will thus be seen that the whole series of spindles are driven simultaneously from a single power mechanism and that the movable frame can be adjusted to move the set of spindles carried thereby without in the least manner affecting the operation of the belts on the spindles, as the idlers serve to keep the belts taut and also prevent them from entanglement.

The spindles are each capable of a vertical adjustment by means of a collar H and an adjusting-screw H'. This collar H bears against the cutter-frame in which the spindle is journaled, and when the collar is released from its set-screw *h* the spindle can be raised or lowered by the adjusting-screw H', which works in a rigid bearing below the spindle and applies against the same. The spindles are journaled in suitable bearings or cap-boxes on the frame, said bearings having a cap which is removably secured, as by bolts, to the frame, and the lower series of bearings are in vertical alignment with the rigid bearings for the screws H'.

In the drawings I have shown the spindles in each set as adjusted to bring the routers or cutters in different horizontal planes to enable the machine to operate on seats or backs having a double or compound curvature; but it is evident that the machine can be adapted for operation on seats or backs with flat surfaces by simply lowering certain of the spindles and raising certain others or so manipulating the screws as to adjust all the spindles at a uniform height. It is thus important that the spindles shall be capable of independent vertical adjustment in their supporting-frames, as such adjustment provides for operation of the cutters or routers on work of different kinds, either flat seats or seats having a double or compound curvature.

I designates the carriage for holding the work, which consists of the flat horizontal side and end bars arranged on top of the machine-frame A, and the end bars of the carriage are connected to said frame A by slide-joints *i i*, (see Fig. 2,) which permit the carriage to be moved across the frame and the line of the routers or cutters on the spindles. The movement of the carriage can be effected by any preferred means; but I prefer to employ the hand-screw J, which works in a part of the main frame, and is tapped in a vertical web or flange on the under side of the front rail of the carriage-frame. (See the detail view, Fig. 6, of the drawings.) The movement of the carriage is varied by means of an adjusting-screw J', operating in a box on the main frame and arranged to contact with a vertical web on the under side of the rear rail of the carriage, so that the movement of the carriage under the influence of the hand-screw J can be regulated and varied to suit the nature of the work clamped on the carriage. On the top of the carriage are the angular brackets M M', which are arranged

at or near opposite ends thereof, and these brackets constitute the inclined bed on which the seat or back is placed, the work being clamped in place by any suitable means.

This being the construction of my machine, the operation thereof may be briefly stated as follows: If a back or seat having a double or compound curvature is to be operated on, it is placed on the angular brackets M M′ and clamped in a fixed position on the carriage and the cutters adjusted at varying heights, as indicated in the drawings. If, however, a flat piece of wood is to be gained, it is clamped to the carriage on the angular brackets and the cutters adjusted at a uniform height. Any suitable means may be employed to clamp the work in its inclined position on the brackets M M′. The work having been clamped and the cutter-spindles adjusted, power is communicated in any way to the driving-drum and the series of belts thereby operated to rotate all the series of spindles and the routers thereon. The regulating-screw E is rotated to move the frame C and bring the series of cutter-spindles thereon into proper position beneath the work, after which the hand-screw J is rotated to move the carriage and work across the line of the cutters, which thereby cut two series of gains, one series being near one end of the wood and the other near the other end or at any desirable line across the same, each gain or cut being inclined and gradually increasing in depth from the face of the wood to the inner terminal of the cut. All the series of gains are thus cut in the wood at one operation, thereby saving handling or manipulation of the work, and as the carriage is moved in a straight line for a distance equal to the length of the cut the wear on the routers and parts is very greatly reduced.

I am aware that changes in the form and proportion of parts and details of construction of the mechanism herein shown and described as an embodiment of my invention can be made without departing from the spirit or sacrificing the advantages thereof, and I therefore hold myself at liberty to make such modifications as fairly fall within the scope of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The process of gaining wood seats and backs adapted for attachment to metallic standards, which consists in moving the same while in a vertically-inclined position in a horizontal line across a series of relatively-fixed vertical cutters or routers rotating in different horizontal planes and producing therein a series of inclined gains which increase in depth from the face of the wood to the terminal of the cut, substantially as described.

2. The process of gaining curved seats or backs for attachment to metallic standards, which consists in fixing the wood in a vertically-inclined position, moving the same in a horizontal plane while in said inclined position to a series of vertical rotary cutters adjusted to varying heights, and forming gains therein which increase in depth from the face of the wood to the terminal of the cut, substantially as described.

3. In a machine for gaining wood, the combination of two series of spindles, each carried by a separate frame, a common driving mechanism, and driving-belts, each of which passes around a spindle of each set of spindles, and a movable work-carriage, substantially as and for the purpose set forth.

4. In a machine for gaining wood, the combination of a machine-frame having the longitudinal bearing-bars, the stationary frame immovably supported thereon, the movable frame supported by said bearing-bars, the two series of cutter-spindles mounted in said stationary and movable frames, a work-carriage supported on the machine-frame above the cutters, and means for driving the cutter-spindles, substantially as described.

5. In a machine for gaining wood, the combination of a stationary frame carrying a series of cutters capable of rotation on their axes, an adjustable frame movable toward and from the stationary frame and likewise carrying a series of rotary cutter-spindles, driving-belts passing around the spindles on the stationary and movable frames, and a work-carriage, substantially as described.

6. In a machine for gaining wood, the combination of a machine-frame, a stationary cutter-frame mounted therein and carrying a series of rotary cutter-spindles, a movable frame mounted in said machine-frame to be adjusted toward or from the stationary frame and carrying a series of cutter-spindles, the idler-pulleys adapted to be adjusted with the movable frame, the driving-belts passing around the idler-pulleys and the spindles of the two series, and a work-carriage, substantially as and for the purpose described.

7. In a machine for gaining wood, the combination of the longitudinal bearing-bars, the stationary cutter-frame clamped thereon and carrying a series of vertical spindles, the movable frame mounted on the bearing-bars and having the cutter-spindles and a series of idler-pulleys at one side of the spindles, the driving-belts, the hand-screw for moving the movable cutter-frame, and a work-carriage, substantially as described.

8. In a machine for gaining wood, the combination, with a machine-frame and a series of vertical cutter-spindles, of a work-carriage connected to the frame and adapted to be moved in a direct line across the cutter-spindles, substantially as described.

9. In a machine for gaining wood, the combination of a main frame, two series of vertical cutter-spindles, one series being carried by a stationary frame and the other series of spindles carried by a movable frame adapted to travel toward or from the stationary frame, an open-frame work-carriage sup-

ported on the top of the main frame and movable thereon transversely across the two series of cutter-spindles, and the inclined work-holding beds supported on the movable work-carriage, substantially as described.

10. In a machine for gaining wood, the combination of a stationary frame carrying a series of cutter-spindles, a movable frame also carrying a series of spindles and a series of idler-pulleys, a common driving-drum, belts passing around said drum, the idler-pulleys, and the spindles of both sets, means for adjusting the movable cutter-frame, and a work-carriage provided with angular brackets for the work and having means for moving the same in a right line across the series of routers or cutters on the two sets of spindles, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ALMON E. PRESTON.

Witnesses:

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RICHARD J. MARKHAM.