

(No Model.)

3 Sheets—Sheet 1.

G. STICKLEY.
WOOD BENDING MACHINE.

No. 541,890.

Patented July 2, 1895.

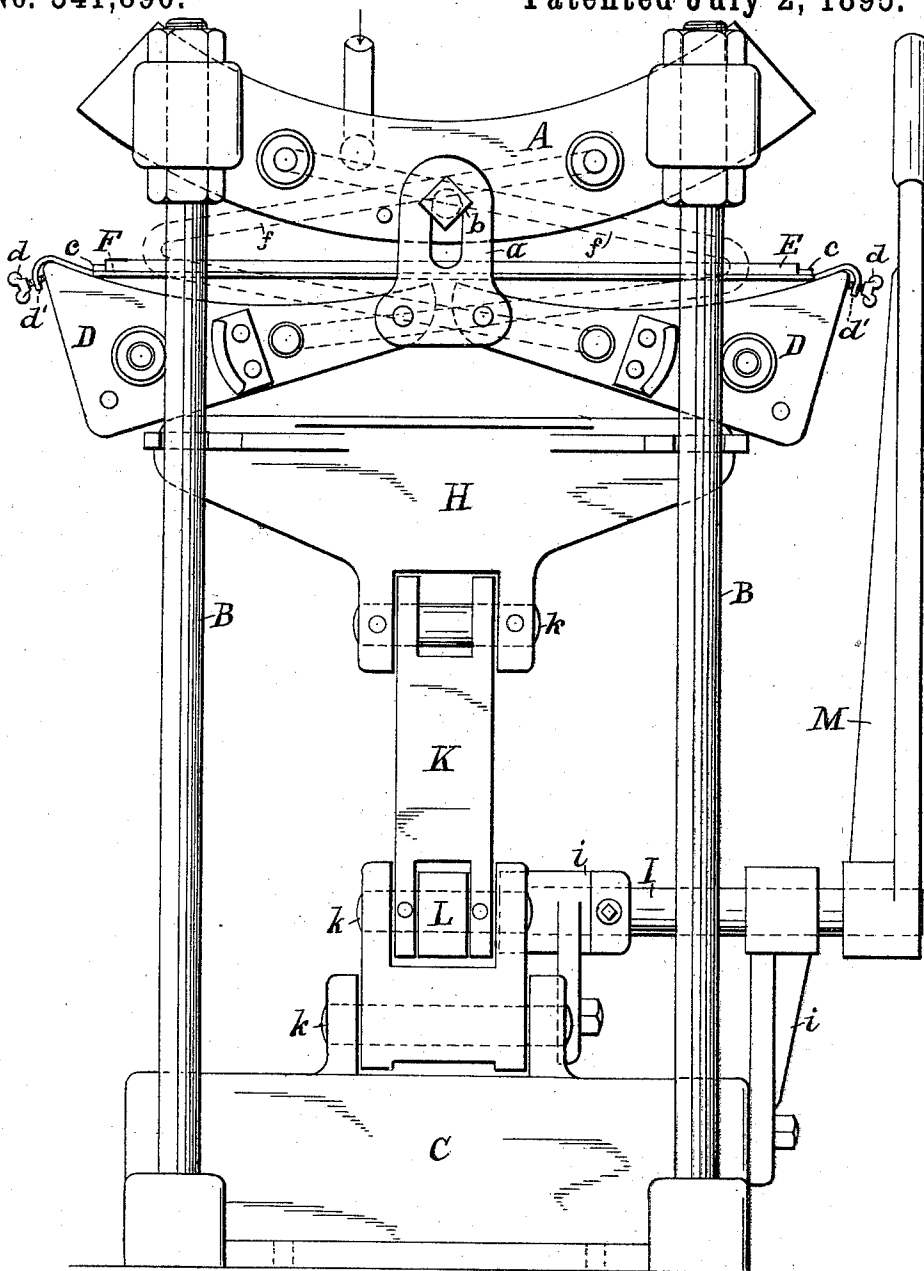


Fig. 1.

Witnesses:

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R. S. Dewey.

Inventor.

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Gustave Stickley
By C. H. Duell
his Attorney.

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his Attorney.

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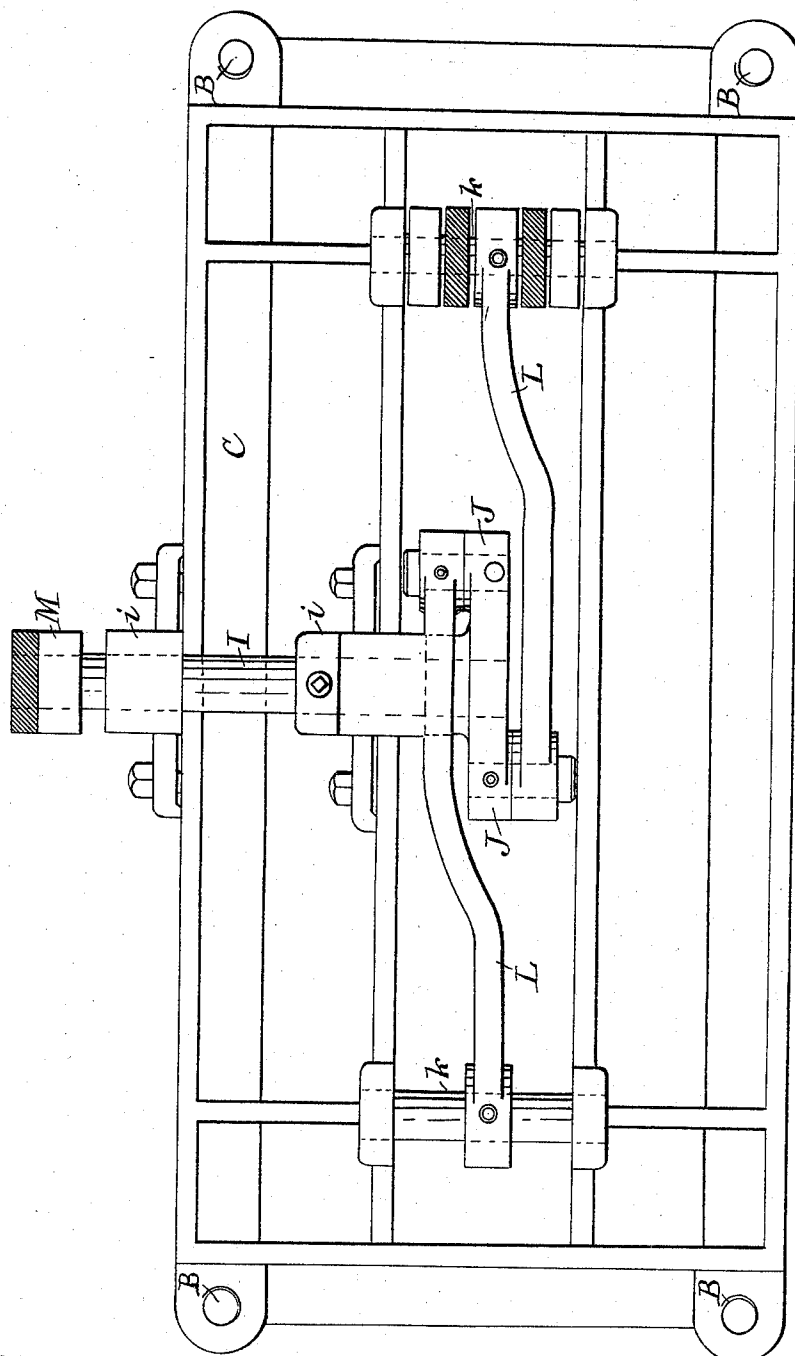


Fig. 2.

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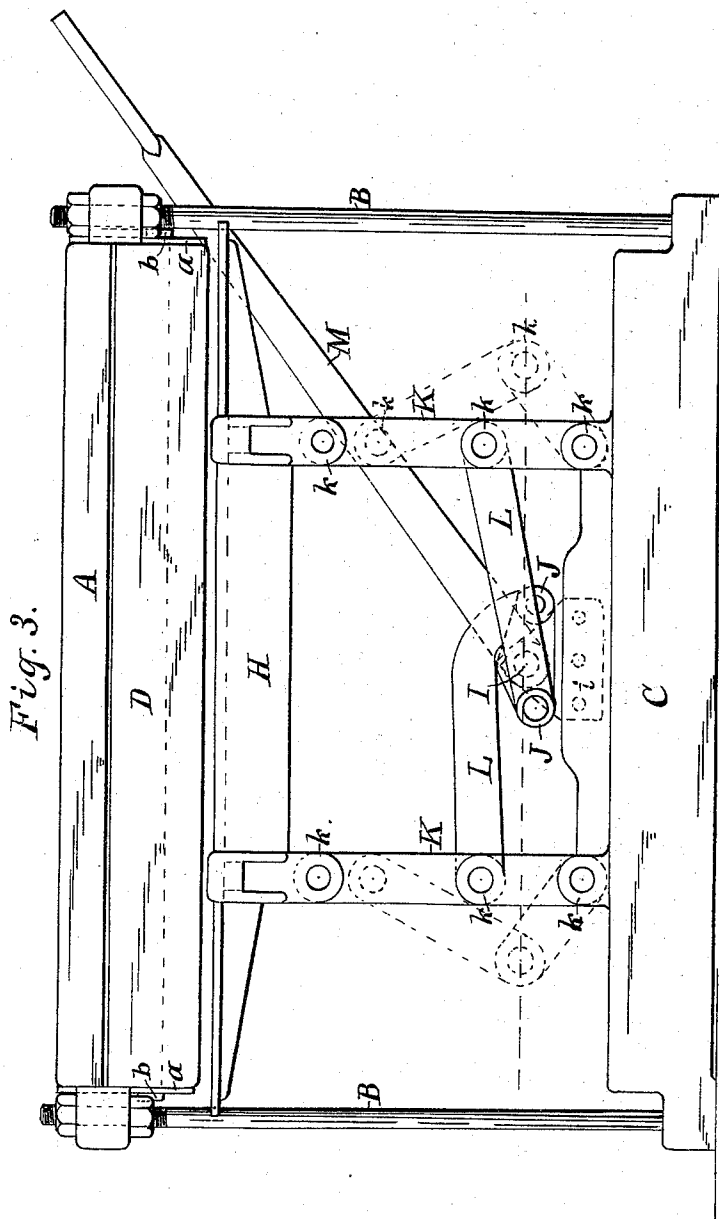
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UNITED STATES PATENT OFFICE.

GUSTAVE STICKLEY, OF SYRACUSE, NEW YORK.

WOOD-BENDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 541,890, dated July 2, 1895.

Application filed October 10, 1894. Serial No. 525,465. (No model.)

To all whom it may concern:

Be it known that I, GUSTAVE STICKLEY, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Wood-Bending Machines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to machines for bending and drying wood, such as boards for chair backs, &c., and has for its object to prevent straining and breaking the fibers of the wood on the outer curved side of the board during the operation and to economize in time, labor and material.

With ordinary wood bending machines in use, a large percentage of the pieces bent are rendered worthless because broken at or near the center while being bent, while other pieces are used after much time is spent in gluing up and smoothing.

My invention consists in the combination in a wood bending machine, of a convex die, a concave die divided centrally in two parts, said parts being hinged together at their ends and inner sides, and suitable means to move the said dies relatively to each other.

In the drawings hereto annexed and forming a part of this specification, Figure 1 is an end elevation of my improved wood-bending machine. Fig. 2 is a plan view taken below the dies, and Fig. 3 is a side elevation showing clearly the toggle mechanism for operating the dies.

Referring specifically to the drawings, A is the upper stationary die, its lower side being curved convexly as the outer side of a cylinder. This die is supported on four posts, B, B, which extend vertically from a base C.

D, D, represent the lower and movable die divided centrally, vertically and longitudinally in two parts, each part being concaved on its upper side to fit or correspond with the lower side of the upper die A. The movable die is between the posts or standards, B, B, and each part is connected or hinged to the upper die by means of a slotted link, *a*, depending from the center of each end of the latter die. The links are secured to said die by bolts or screws, *b*, *b*, passing through the slots and entering the die. The inner sides of the divided die, D, D, are pivoted to the

lower ends of the said links and are thereby suspended from the upper die. The slots in the links serve to guide the lower and divided die in its upward movement and to allow it to drop a distance below the lower surface of the upper die, depending somewhat upon the thickness of the piece to be bent between the dies.

Several pieces may be bent at one operation, if desired, by placing them side by side. The links, *a*, *a*, allow the lower die to drop so that the pieces may be easily inserted between the dies and removed after they are bent. The pieces of wood, E, are placed upon a strip or sheet of flat metal, F, having flanges, *c*, *c*, or ribs on its side edges to bear against the ends of the piece or pieces during the bending operation to prevent the wood from stretching and the fibers from separating which weakens the piece.

After the piece or pieces are inserted between the dies, the lower die is raised until the inner sides thereof press the pieces to be bent against the center of the upper die. Then pressure is exerted to swing the outer sides of the sections of the lower die, D, upward to the upper die. Pressure may be exerted in various well known ways, but I prefer to use, and show in the drawings, a toggle mechanism adapted to be operated by hand. This toggle mechanism consists of a shaft, I, extending horizontally and transversely across the machine below the dies and near the base, standards, *z*, *z*, on the base in which the shaft is pivoted, short rock-arms, J, J, keyed to the shaft below the central part of the dies, supports K, K, for the block, H, extending upward from the base on each side of the said rock-arms, each of said supports having three joints *k*, *k*, *k*, therein, connecting bars, L, L, extending from the central joints of the said supports to the ends of the rock-arms, and a lever, M, on the end of the shaft by which the toggle mechanism is operated, and the block, with the swinging parts of the lower die, is raised and lowered.

It will be readily seen that when the hand lever, M is in the position shown in Fig. 3, the jointed supports stand vertically with the die raised and that when the said lever is thrown over toward the opposite end of the machine, the jointed supports are forced outward as

indicated in dotted lines in said figure allowing the block, H, with the parts of the lower die, D, resting thereon to drop or separate from the upper or stationary die A.

- 5 The metal plate, F, holding the pieces, E, to be bent is secured to the outer sides of the lower die by set screws, *d*, passing through flanges, *d'*, bent downward on the side edges of the said plate, as shown in Fig. 1, so that
10 the plate will be straightened when the die, D, is lowered.

The dies are made of metal and hollow, as usual, so that steam may be admitted or passed through them to heat them and dry the work after it is bent and while it is held
15 between the dies so that it will retain its shape after it is released.

Flexible pipe, *f, f*, is shown in dotted lines connecting the stationary or upper die with
20 the movable or lower die to carry the steam from the one to the other, the steam being admitted to the stationary die, A, first, as shown clearly in the drawings.

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

1. The combination in a wood bending machine, of a convex die, a concave die divided centrally in two parts, said parts being pivoted
30 together, each part being connected to the convex die and adapted to swing relatively to each other, and suitable means to move the said dies relatively to each other, as set forth.

2. The combination in a wood bending machine, of a stationary convex die, standards supporting said die horizontally, a concave die below the convex die and divided centrally and vertically in two rigid parts, the inner
35 sides of the said parts being pivoted and connected together, and means to force the lower die toward the upper die, as set forth.

3. The combination in a wood bending machine, of a convex die, a concave die divided centrally and longitudinally in two rigid parts,
40 each part being pivoted at both ends, means to hold the center of the lower die a given distance from the upper die while the dies are separated farther at their sides, and means also to force the dies together, as set forth.

4. The combination in a wood bending machine, of a stationary horizontal die having its under side convexly formed, standards supporting said die, a movable horizontal die be-
50 tween the said standards below the first die

and having a concave upper surface and di- 55
vided vertically, centrally and longitudinally, a link secured to the stationary die at each end thereof pivots on the ends of the concave die near its inner sides entering the said links, and suitable means to swing the sections of 60
the divided die on its pivots toward the upper or stationary die, as and for the purpose described.

5. The combination in a wood bending machine, of a stationary horizontal die having its 65
under side convexly formed, standards supporting said die, a movable horizontal die between the said standards, below the first die, and having a concave upper surface and divided vertically, centrally and longitudinally, 70
a link secured to the stationary die at each end thereof pivots on the ends of the concave die near its inner sides entering the said links, a base upon which the said standards are fixed, and a toggle mechanism mounted on the said 75
base and supporting the sides of the lower die and adapted to raise and lower the same, as set forth.

6. The combination in a wood bending machine, of a stationary horizontal die having its 80
under side convexly formed, standards supporting said die, a movable horizontal die between the said standards, below the first die, and having a concave upper surface and divided vertically, centrally and longitudinally, 85
a link secured to the stationary die at each end thereof and pivoted to the ends of the concave die near its inner sides, a base upon which the said standards are fixed, toggle supports on the base, block H, connecting bars, L, L, 90
rock-arms, J, J, shaft, I, and lever, M, substantially as shown and described.

7. The combination in a wood bending machine, of a convex die, hangers on the ends of the said die a concave die divided centrally 95
and pivoted near its inner sides to said hangers, a plate to hold the work supported on the concave die and having its side edges bent down, screws passing through said edges and bearing against the sides of the concave die, 100
and means to raise and lower the latter die, substantially as shown and described.

In testimony whereof I have hereunto signed my name.

GUSTAVE STICKLEY. [L. S.]

Witnesses:

MARK W. DEWEY,
R. S. DEWEY.