

(No Model.)

J. DETERS.
STAVE BENDING MACHINE.

No. 508,506.

Patented Nov. 14, 1893.

Fig. 1.

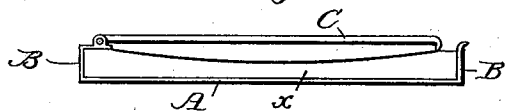


Fig. 2.

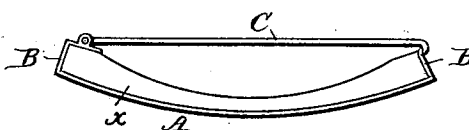


Fig. 3.

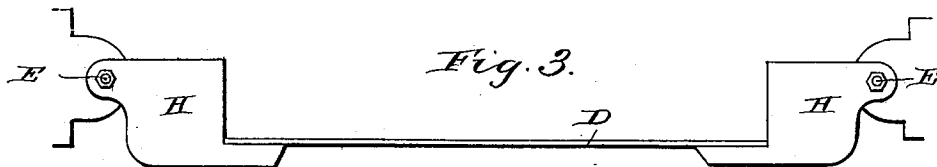


Fig. 4.

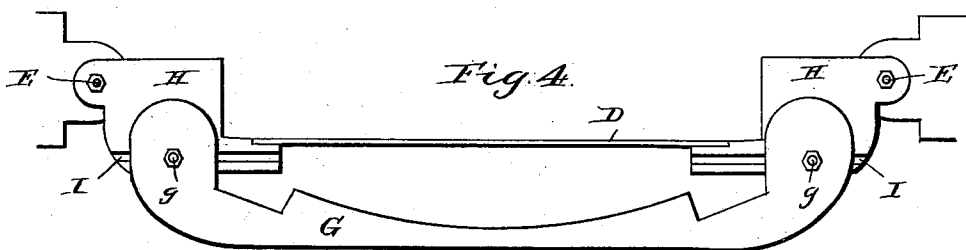


Fig. 5.

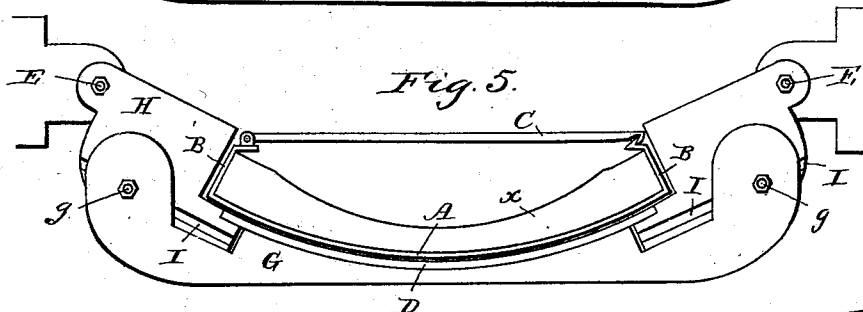


Fig. 6.

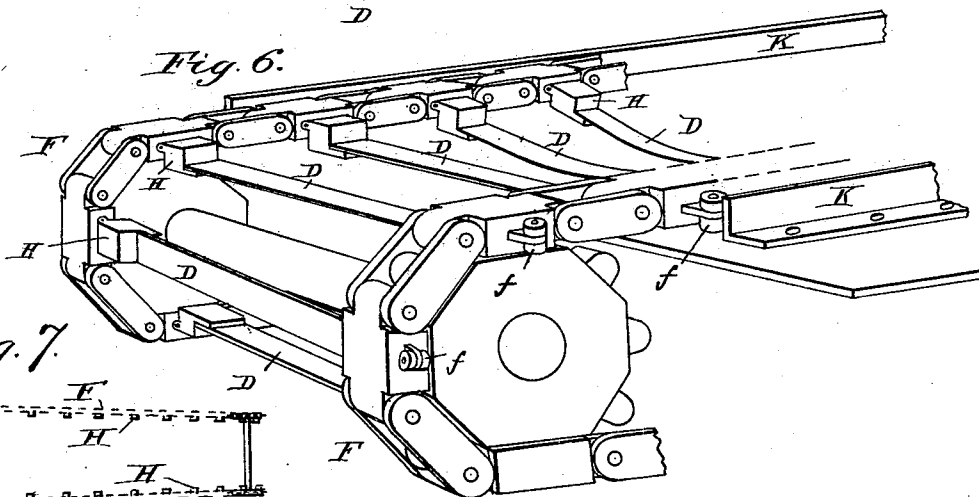
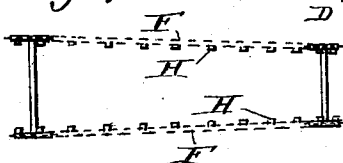


Fig. 7.



Witness:

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JOSEPH. DETERS, OF LOUISVILLE, KENTUCKY.

STAVE-BENDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 508,506, dated November 14, 1893.

Application filed June 1, 1891. Serial No. 394,767. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH DETERS, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented a new and useful Stave-Bending Machine, of which the following is a specification.

Heretofore, according to my knowledge and experience, the usual method of bending the staves used in making heavy kegs, barrels and hogsheads has been, while the staves are hot from steaming, to set together in a circle on end all the staves to be used in making the keg, barrel or hogshead and after hooping together the lower ends, to force the upper ends of the staves together by drawing tight around them a strong looped rope. There being no support for the staves thus subjected to great strain many of them usually break or crack about the middle. By my invention I avoid this breaking to a great extent and also give the staves a more permanent set in their proper bent form. I attain these objects by the mechanism illustrated in the accompanying drawings and as follows:

In said drawings, Figure 1 is a side view of a stave plate and clamp made according to my invention. Fig. 2 is a similar view of the plate with the stave bent therein. Fig. 3 is a side view of a device for bending the plate and stave. Fig. 4 is a similar view of such device provided with a former. Fig. 5 is a view of the plate, bending device, and former in operation. Fig. 6 is a perspective view of a bending apparatus embodying further features of my invention. Fig. 7 is a diagrammatic plan view illustrating the convergence of the pressure devices.

The stave *x* when ready to go through the bending process is usually straight and steamed hot. I place it in a portable steel back plate (A in Fig. 1 of the drawings) which is flexible and which has upright ends or flanges (B Fig. 1), hinged to one of which is a clamp (C Fig. 1) which, when the ends are pressed toward each other in the manner to be presently described, engages the other end or flange (B Fig. 2) of the portable back plate and holds the latter together with the inclosed stave in its desired bent form until the stave has had time to become dry and cool when

the clamp is lifted and the stave removed from the plate.

To obtain the desired pressure to bend the portable back plate and inclosed stave as indicated above I place them upon a second flexible steel plate (D Figs. 3, 4 and 5) the ends H of which working upon pivots or hinges (E E Fig. 3) are connected with and carried by converging endless chains (F F Fig. 6) between which, as the chains progress in converging lines, the opposite ends of both the flexible plates are gradually forced toward each other and the plates and inclosed stave consequently bent into proper position when, as above shown, the clamp of the portable plate engages the flange (B, Fig. 2.) After the plates and inclosed stave have passed the point where the endless chains come nearest each other, the pressure upon the ends of the plates ceases and the portable plate and inclosed stave are removed from the chain to await the drying and cooling of the stave above mentioned.

I preferably use steel plates as stated but any other strong and flexible material may be used instead. I also, as stated, use an automatic, hinged clamp, but can also use a clamp without hinging but with end catches (as at B in Fig. 2) at both ends to engage the two ends of the portable plate.

Another improvement that I have used in this machine is the former shown as G in Fig. 4. This is a rigid former, preferably steel or cast iron, so curved upon its upper surface as, when the plates above mentioned and the inclosed stave are pressed against it, will give uniformity of curvature to their bending and also brace them against breaking. This former is attached to the end pieces of the plate (H in Figs. 3, 4, 5 and 6) by screws or bolts *g* working in grooves in such end pieces as shown in Figs. 4 and 5 marked I.

Fig. 6 shows part of the machine with the converging endless chains (F and F) and the attached plates (D, D; D) without formers, ready to receive the portable plates and staves.

At K are shown converging plates or rails adapted to guide the chains and hold them in position to bend the staves. *f* are anti-friction rollers carried by the chains and adapted to bear upon the inner faces of said

rails. But if the chains be properly supported at their ends by any well known form of wheel or pulley, or by other suitable means, they will serve to bend the staves without the assistance of said rails, though I prefer to employ the latter.

By converging chains I intend not only chains all parts of which converge, but also chains the essential stave-bending portions of which alone are caused to converge, the stave holding and bending devices being attached to said converging portions. This latter construction, which for most purposes I prefer in practice, is not claimed specifically in this application, but is the subject matter, together with other improvements, of my application dated September 28, 1892, Serial No. 484,002.

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

1. The machine for bending staves substantially as herein described comprising converging pressure devices for forcing toward each other the ends of and causing the bending of the stave, and means comprising an endless conveyer for moving the stave as a whole laterally or in a direction crosswise of the same between said pressure devices.

2. In a machine for bending staves, converging endless chains between which such staves are bent, and means for actuating the chains longitudinally, substantially as herein described.

3. In a machine for bending staves, converging endless chains between which such staves are bent by pressure upon their ends, means for actuating the chains, and guides for the same, substantially as herein described.

4. The combination with a bending plate D, having the end pieces H, of a portable flexible plate for bending staves with a clamp C hinged thereto at one end and holding such

plate and inclosed stave in their position as bent, substantially as herein described.

5. The flexible plate with movable pressure ends, combined and connected with a converging endless chain and adapted to receive and form a supporting back for a stave and bend the same by end pressure, substantially as herein described.

6. The flexible plate with movable pressure ends adapted to receive and form a supporting back for a stave and bend the same by end pressure substantially as herein described, combined with an endless carrier having converging sides.

7. The pressure ends connected to and moving with converging endless chains adapted to receive a stave between them and bend the same substantially as herein described.

8. The former in a stave bending machine adapted to distribute the pressure upon a stave bent by compression of its ends and to support against breaking and form such stave while bending, substantially as herein described, combined with an endless carrier having converging sides.

9. The flexible plate with movable pressure ends moving between converging guides and adapted to receive and form a supporting back for a stave and bend the stave by end pressure substantially as herein described.

10. In a machine for bending staves the combination of end pieces or holders for the staves pivotally mounted eccentrically or to one side of the position of the stave, and means for forcing said pivots toward each other longitudinally of the stave, substantially as set forth.

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

JOSEPH DETERS.

Witnesses:
JNO. G. SIMRALL,
JOHN C. DOOLAN.