(No Model.)

F. & J. BRENNER.

STAVE BENDING MACHINE.

No. 456,135. Patented July 21, 1891.

Fig. 1.

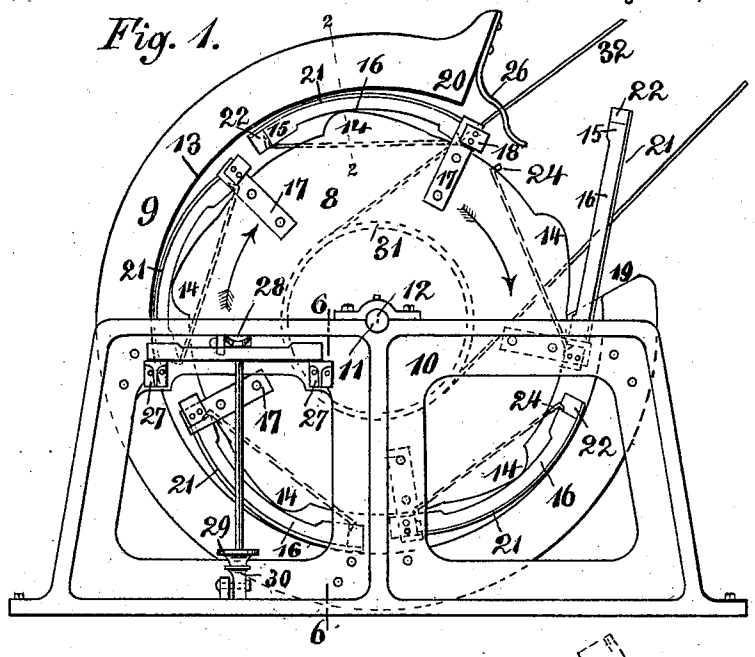


Fig. 2.

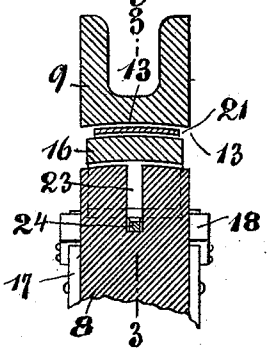


Fig. 3.

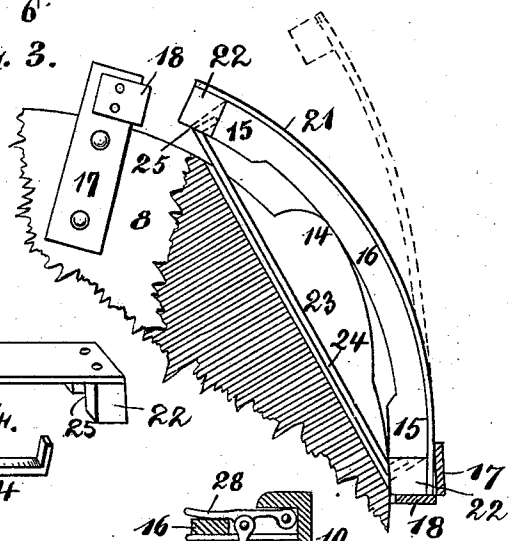


Fig. 4.

Fig. 5.

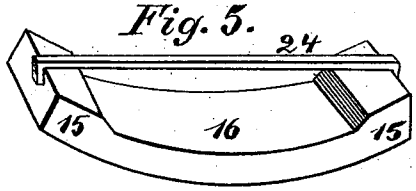
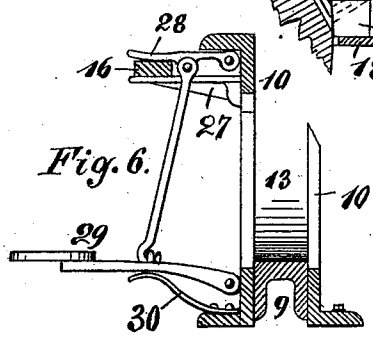


Fig. 6.



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UNITED STATES PATENT OFFICE.

FREDERICK BRENNER AND JOHN BRENNER, OF CINCINNATI, OHIO.

STAVE-BENDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 456,135, dated July 21, 1891.

Application filed September 12, 1890. Serial No. 364,742. (No model.)

To all whom it may concern:

Be it known that we, FREDERICK BRENNER and JOHN BRENNER, both citizens of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Stave-Bending Machines; and we do 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates generally to machines used in the manufacture of cooperage stuff, and specifically it relates to machines employed for the purpose of bending longitudinally staves before they are assembled to form the respective vessels for which they are intended. With this preparatory bending process omitted the staves could not be put together as well and bent to assume their proper concavo-convex shape without causing considerable loss by breakage. Before being so bent the staves are generally steamed in order to soften them.

The construction of our machine is described in the following specification and illustrated in the accompanying drawings, in which—

Figure 1 is a side view of our machine. Fig. 2 is a vertical section on line 2 2 of Fig. 1, drawn on an enlarged scale. Fig. 3 is a longitudinal section on line 3 3 of Fig. 2. Fig. 4 shows in a perspective view part of a holder and part of a clamp. Fig. 5 shows a perspective view of a stave as it appears after leaving the machine. Fig. 6 is a vertical section on line 6 6 of Fig. 1.

The machine consists substantially of a disk 8 revolving within a stationary frame 9, which again is sustained by another frame 10, containing also the bearings 11 for shaft 12, on which disk 8 is secured. The inner surface 13 of frame 9 is opposite the face of disk 8 and concentric with it. This frame does not, however, completely surround the disk, but is partly left open from 19 to 20 in order to permit the introduction of the staves. At 14 the face of the disk is raised in order to provide a surface over which the stave is bent and also to provide sufficient room for the thicker or croze end 15 of the stave 16.

17 are stirrups secured to the disk, forming, in connection with suitable pieces 18, a socket for the reception of one of the stave ends as they are fed into the machine, as shown at 19, Fig. 1. The disk revolving in the direction of the arrow carries the stave into and through the space between it and the frame, where, being closely confined, it is bent as shown. The inner face of this frame forms the shaping-surface, against which the staves are pressed by the disk, and to overcome their resistance, which is considerable, it must be perfectly rigid and immovable and supported by a heavy frame constructed in the most substantial manner. To lessen the friction which the rough wood would cause while coming in contact with the inner surface 13 of frame 9 and to protect the surface of the staves and keep them from splitting, especially at their ends, they are put into a suitable holder, which consists of a thin steel strap 21, having two suitable abutments 22 22, secured to each end. By virtue of its elasticity it conforms itself to the shape which the stave assumes and by its smoothness greatly lessens the friction.

The staves having a tendency to straighten again after leaving the machine, the following means have been provided to retain them for some time in their bent position after having passed through the latter.

23 are slots cut edgewise in the face of disk 8 for the reception of clamps 24. At 25 the abutment 22 of the stave-holder is recessed to admit the ends of said clamps.

In feeding the staves in they are first put into the holder with a clamp partly in position—that is, one of its ends being within recess 25 and also in contact with one stave end. (See at 19, Fig. 1.) Being shorter than the stave, its other end cannot of course get into its proper position yet. While the stave passes on, however, it shortens as it is bent, and when short enough permits the other end of the clamp 24 to enter the other recess 25 of the stave-holder, thus also engaging with the other end of the stave. This is the position of the parts most plainly shown in Fig. 3.

Fig. 5 shows the stave held in its bent po-

sition and after having left the machine. As the stave emerges at the discharge end, the stave-holder, owing to its elasticity, has a tendency to disengage itself with a sudden jerk, as shown by dotted lines in Fig. 3. To prevent injury and damage, a spring 26 is provided, which serves as a stop against which the holder strikes when disengaging itself from the stave. It often happens that from some cause, irregularities of the staves principally, the other end of the clamp fails to engage properly with the end of the stave. In such emergencies the clamp has to be put on by hand, aided by an auxiliary bending device constructed as follows:

27 27 are two brackets secured to frame 10 and serving as a support for the stave.

28 is a lever pivoted to frame 10, and it connects with a rod to treadle 29, also pivoted to frame 10. Lever 28 reaches over the stave and bends it when the treadle is depressed. While so bent the clamp is applied and engages with the stave ends after the treadle is released. A spring 30 restores treadle and lever to their normal positions.

To accommodate the shape of the staves crosswise the face of the disk 8 is convex, while the inner surface 13 of frame 9 is concave, as shown in Fig. 2. It need hardly be mentioned that the machine is adapted to bend wood for any other similar purpose. Disk 8 is best driven by a pulley 31 and belt 32, but toothed gear connection may be substituted.

A number of these machines may be conveniently arranged on one shaft. Longer staves require, of course, larger disks. Owing to the peculiar arrangement of the face of the disk, however, several sizes may be bent in one machine.

Having described our invention, we claim as new—

1. In a stave-bending machine, the combination, with a revolving disk the face of which is adapted to receive staves, of a heavy, rigid, and immovable frame completely and continuously surrounding the former, excepting a combined feed and discharge opening for the staves, said frame constituting the shaping-surface against which the staves are pressed by the disk, the face of which is opposite this shaping-surface and concentric with it, all as fully shown and described.

2. In a stave-bending machine, the combination, with a revolving disk the face of which is provided with raised portions and depressions which support the stave and conform to its unequal thickness, of a heavy, rigid, immovable frame completely and continuously surrounding the former, excepting a combined feed and discharge opening for the staves, said frame constituting the shaping-surface against which the staves are pressed by the disk, the face of which is opposite this shaping-surface and concentric with it, all as fully shown and described.

3. In a stave-bending machine, the combination, with a revolving disk the face of which is adapted to receive staves by being provided with raised portions 14 and stirrups 17, of a frame surrounding the disk, its inner surface, which is opposite the face of the latter, being concentric therewith, and sufficient opening being left in said frame to permit the introduction of the staves, substantially as shown and described.

4. In combination with a stave-bending machine consisting of a disk revolving within a stationary frame and adapted to receive and hold staves, the adjacent surface of the frame being concentric with said disk, hooks 24, resting in suitable slots in the face of disk 8, engaging with and holding the stave in its bent position, all substantially as shown and described.

In testimony whereof we affix our signatures in presence of two witnesses.

FREDERICK BRENNER.
JOHN BRENNER.

Witnesses:
RANKIN D. JONES,
CARL SPENGEL.