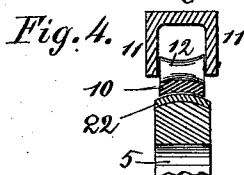
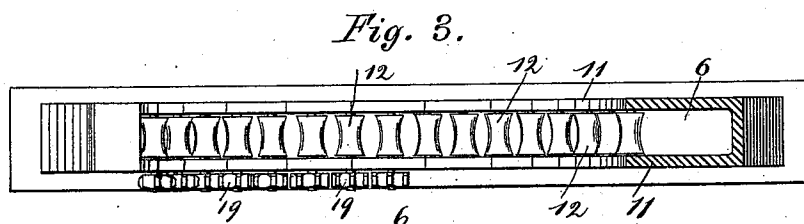
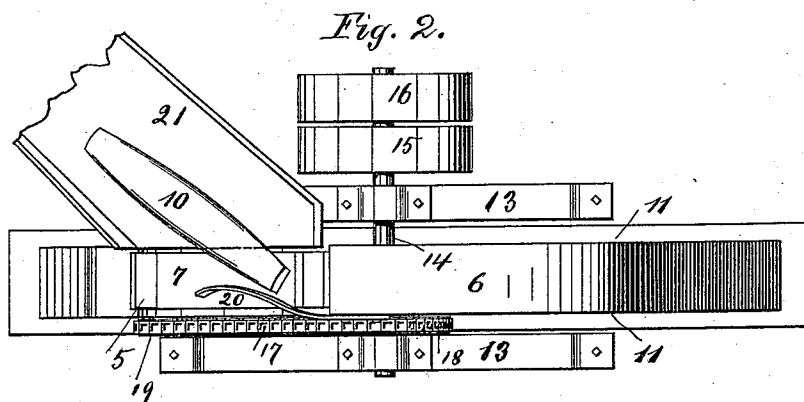
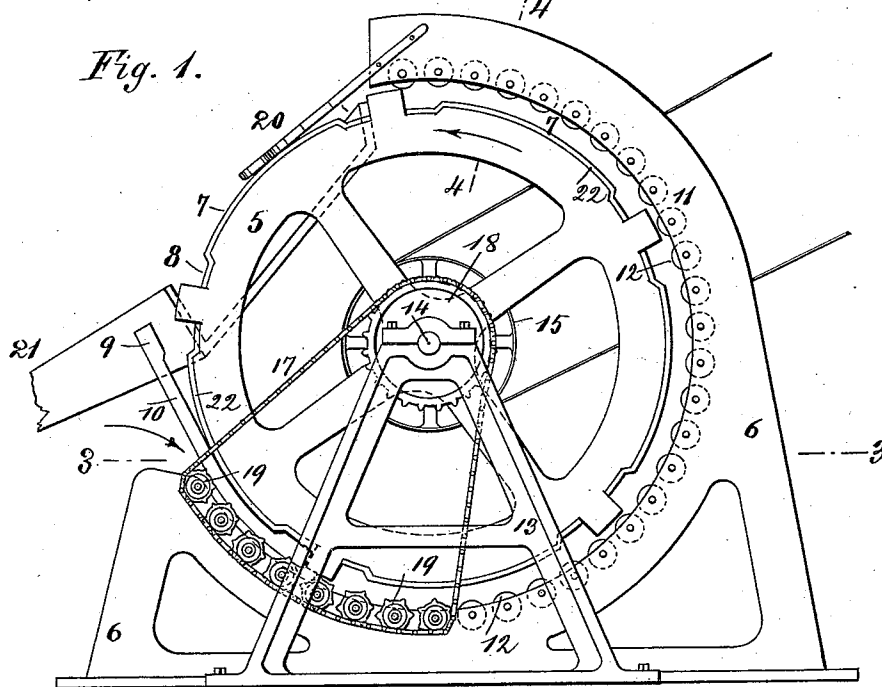


(No Model.)

F. & J. BRENNER.
STAVE BENDING MACHINE.

No. 447,295.

Patented Mar. 3, 1891.



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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. 447,295, dated March 3, 1891.

Application filed April 24, 1890. Serial No. 349,273. (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. Without going through this preparatory bending process 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 going through this bending process 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 elevation of our machine. Fig. 2 is a top view of the same. Fig. 3 is a section on line 3 3 of Fig. 1, wheel 5 being omitted; and Fig. 4 is a section on line 4 4 of Fig. 1.

The machine consists, substantially, of a wheel 5, revolving within a stationary frame 6 and within a large circular opening therein, the periphery of which is parallel and concentric with the periphery of said wheel. The face of wheel 5 is shaped as shown at 7, so as to accommodate the shape of the stave. At 8 it is deepened to admit the thicker or croze ends 9 of the latter. Wheel 5 revolves, as indicated by an arrow, and carries the staves into the space between its face and the inside of stationary frame 6, closely confining and bending them as they pass through between the two. To ease the friction between wheel

5 and frame 6, the inner surface of the latter, being opposite the face of wheel 5, is formed by a number of rollers 12, the sides 11 11 of frame 6 forming and containing their bearings. These rollers are arranged in a circular line parallel with the face of the wheel 5 and around the circular opening of frame 6. Their faces are concave, while the face of wheel 5 is convex in order to conform to the shape of the stave crosswise, they being dressed to the proper circular shape, as most plainly shown in Fig. 4. The distance between the faces of rollers 12 and wheel 5 corresponds substantially with the thickness of the staves.

13 13 are the bearings for shaft 14 of wheel 5, and 15 and 16 are tight and loose pulleys, respectively, by means of which shaft 14 is revolved.

Toothed gear connection may be substituted for pulleys 15 and 16, if desirable.

Frame 6 does not completely surround wheel 5, but is partly open, in order to provide sufficient space for the introduction and discharge of the staves.

In order to ease the strain on the machine at the starting-point, where the staves are the stiffest, a number of the rollers may be revolved by means of a chain 17, passing around a sprocket-wheel 18 on shaft 14, and a number of smaller sprocket-wheels 19, journaled at the ends of rollers 12. By this arrangement the straight stave is easily carried in, after which it takes care of itself. 20 is an ejecting device consisting of a spring secured to frame 6 and bent so as to reach in over the face of wheel 5. It readily yields to any part of wheel 5 which may strike it, but whenever it comes in contact with a stave it pushes the same off and ejects it sidewise into a convenient chute 21.

To prevent injury to the machine in cases where the thickness of the staves is irregular, it may be preferable to give the face of wheel 5 some degree of elasticity, and whereby a stave of increasing thickness is readily admitted. A convenient way of doing this is found in the attachment of rubber plates 22, which cover the face of the wheel 5.

As the staves straighten somewhat again after leaving the machine, they are best bent a little more than necessary, which is done

by arranging the diameter of the wheel accordingly.

A number of these machines may be conveniently arranged on the same shaft, longer 5 staves of course requiring larger wheels.

We know it is not new to pass wood between sets of rollers for the purpose of bending it, and therefore do not claim this way of bending wood, broadly. We do claim, however, 10 aspecially-constructed machine intended and adapted for special work—stave-bending in this case—for which purpose such plain roller-machines could not be used, owing to the peculiar shape of the staves.

15 We claim—

1. A stave-bending machine consisting of a wheel the face of which is adapted to receive staves by cutting its face down at the proper places to admit their croze end, in 20 combination with a stationary frame surrounding to the extent of its length this wheel and being circular at its inner surface, which surface is opposite and parallel or concentric with the face of said wheel and formed by a number of small rollers journaled in it, the 25 stave being carried in by the revolving wheel and passed through the space between its face and the faces of the small rollers opposite it, all as fully shown and described.

30 2. A stave-bending machine consisting of a wheel the face of which is adapted to receive staves by cutting its face down at the proper places to admit their croze end, in combination with a stationary frame surrounding 35 to the extent of its length this wheel and being circular at its inner surface, which surface is opposite and parallel or concentric with the face of said wheel and formed by a number of small rollers journaled in it, a part 40 of them near the feed end revolving with the machine to facilitate the introduction of the staves, which are carried in by the revolving wheel and passed through the space between it and the small rollers, all as fully shown and 45 described.

3. A stave-bending machine consisting of a wheel the face of which is adapted to receive staves and yielding to accommodate irregularities in their thickness, in combination 50 with a stationary frame surrounding to the extent of its length this wheel, its inner surface being opposite, parallel, and concentric with the face of the wheel, the stave being

carried in by the revolving wheel and passed through the space between it and the said 55 frame, all as fully shown and described.

4. A stave-bending machine consisting of a wheel the face of which is adapted to receive staves and yielding to accommodate irregularities in their thickness, in combination 60 with a stationary frame surrounding to the extent of its length this wheel, its inner surface being opposite, parallel, and concentric with the face of the wheel and formed by a number of small rollers journaled in it, the 65 stave being carried in by the revolving wheel and passed through the space between it and the said rollers, all as fully shown and described.

5. A stave-bending machine consisting of 70 a wheel the face of which is adapted to receive staves and yielding to accommodate irregularities in their thickness, in combination with a stationary frame surrounding to the extent of its length this wheel, its inner surface 75 being opposite, parallel, and concentric with the face of the wheel and formed by a number of small rollers journaled in it, a part of them near the feed end revolving with the machine to facilitate the introduction of the 80 staves, which are carried in by the revolving wheel and passed through the space between it and the rollers, all as fully shown and described.

6. A stave-bending machine consisting of 85 a wheel the face of which is adapted to receive staves and yielding to accommodate irregularities in their thickness, in combination with a stationary frame surrounding to the extent of its length this wheel, its inner surface 90 being opposite, parallel, and concentric with the face of the wheel and formed by a number of small rollers journaled in it, a part of them near the feed end revolving with the machine to facilitate the introduction of the 95 staves, which are carried in by the revolving wheel and passed through the space between it and the said rollers, and a suitable ejecting device, all as fully shown and described.

In testimony whereof we affix our signatures 100 in presence of two witnesses.

FREDERICK BRENNER.
JOHN BRENNER.

Witnesses:

CARL SPENGLER,
RANKIN D. JONES.