

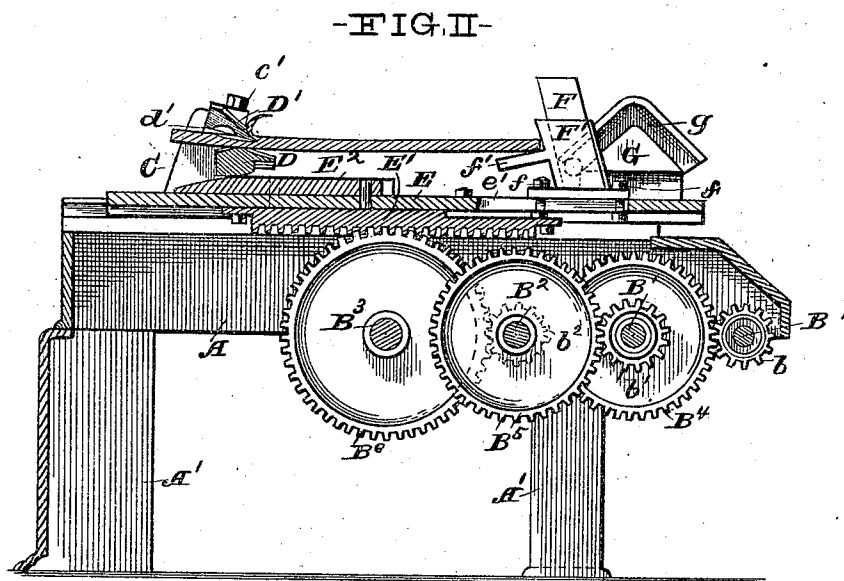
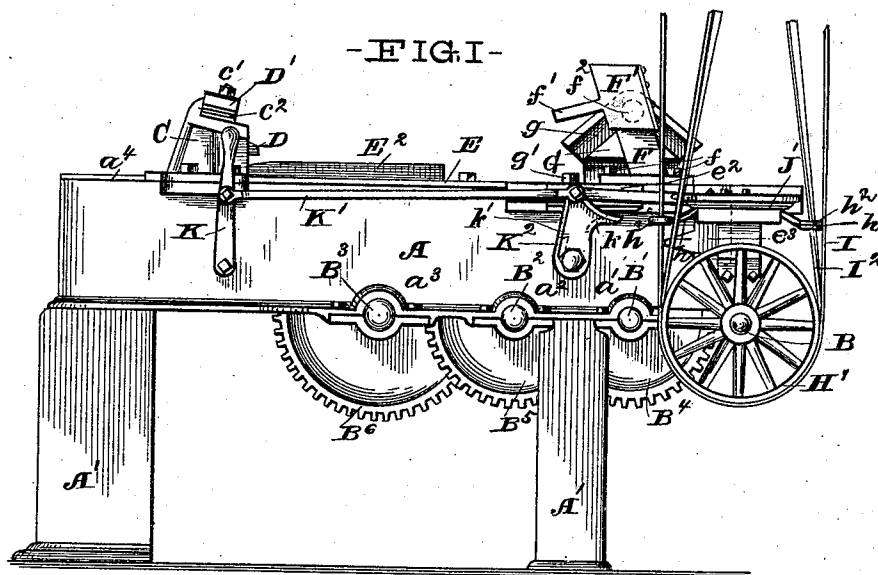
(No Model.)

2 Sheets—Sheet 1.

A. M. BENSON.
MACHINE FOR HOLLOWING STAVES.

No. 501,910.

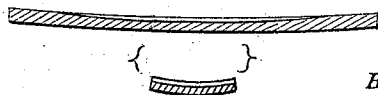
Patented July 25, 1893.



-FIG. VI-

WITNESSES:

J. C. Turner
J. M. Lecher



INVENTOR.

BY A. M. Benson
Hall & Gay ATTORNEYS.

(No Model.)

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-FIG. III-

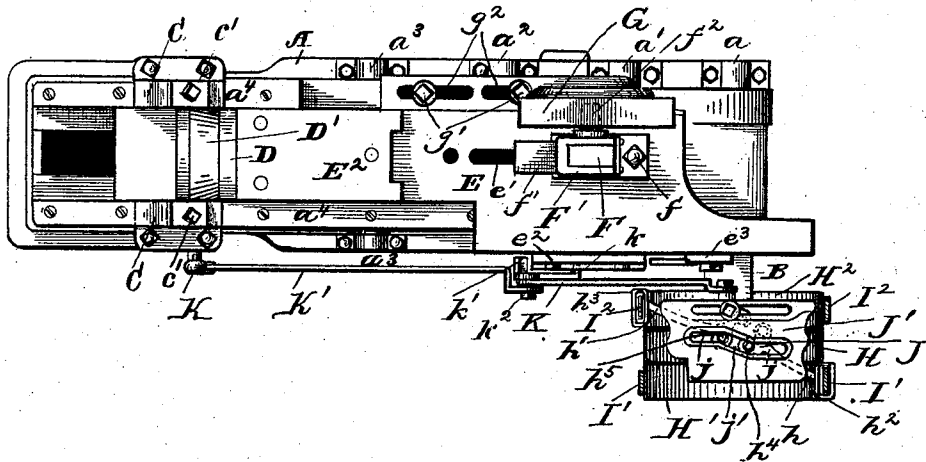
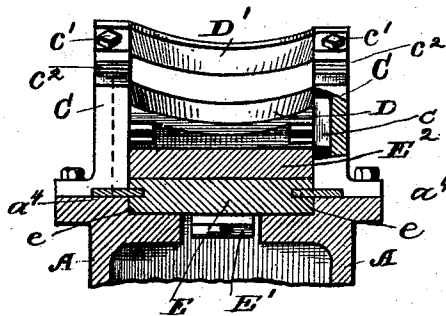
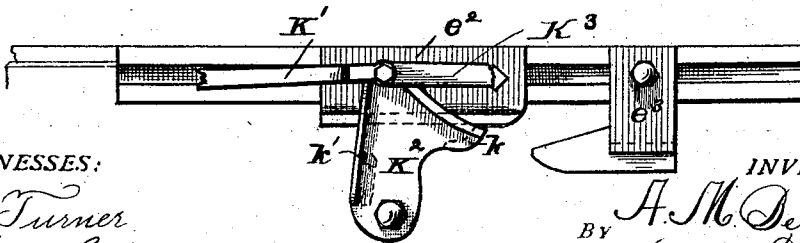


FIG. IV-



-FIG. V-



WITNESSES:

J. C. Turner
J. M. Lecher

INVENTOR.

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ATTORNEYS.

UNITED STATES PATENT OFFICE.

ARZA M. BENSON, OF CLEVELAND, OHIO.

MACHINE FOR HOLLOWING STAVES.

SPECIFICATION forming part of Letters Patent No. 501,910, dated July 25, 1893.

Application filed August 29, 1892. Serial No. 444,339. (No model.)

To all whom it may concern:

Be it known that I, ARZA M. BENSON, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented certain new and useful Improvements in Machines for Hollowing Staves, of which the following is a specification, the principle of the invention being herein explained and the best mode in which

I have contemplated applying that principle, so as to distinguish it from other inventions. The annexed drawings and the following description set forth in detail one mechanical form embodying the invention; such detail

construction being but one of various mechanical forms in which the principle of the invention may be used. In said annexed drawings—Figure I represents a side view of my improved machine for hollowing staves; Fig. II, a longitudinal section of the same; Fig. III, a top plan of the machine; Fig. IV, a vertical cross section on the line IV—IV, Fig. III; Fig. V, a detail side view of a portion of the belt-shifting

mechanism, and Fig. VI, sectional views of a stave treated by the machine. The bed frame, A, of the machine is supported upon legs, A', and is provided with transverse bearings, a, a', a'', and a''', in which, respectively, the drive shaft, B, and the shafts, B', B'', and B''', of the actuating cog wheels, B⁴, B⁵, and B⁶, are journaled. The first, B⁴, of said cog wheels meshes with a pinion, b, upon the drive shaft, and its shaft, B', carries

a pinion, b', which meshes with the second cog wheel B⁵. The shaft, B'', of said cog wheel carries a pinion, b'', which meshes with the third rack actuating cog-wheel B⁶. Two upright brackets, C C, are secured upon the bed frame of the machine and have vertical grooves, c, in their inner faces, in which the ends of the concave curved stave rest, D, slides. A stationary curved gouging knife, D', having a curve corresponding to the stave rest, is secured with its perforated ends upon two bolts, c', screwed into the ends of the brackets, and bears with its perforated end upon washers, c'', upon the bolts; the distance between the knife and rest being adjusted by removing or inserting said washers beneath the perforated ends of the knife. The upper surface of the stave rest is curved

toward the rear, and the under side of the stave rest is slightly beveled so as to afford free passage for a wedge which will be described hereinafter. The under side of the knife is formed with a rounded heel, d'.

A slide, E, is supported to slide upon the top of the bed frame, being guided by longitudinal guide flanges, e⁴, upon the bed frame, which enter longitudinal grooves, e, in the slide. A rack, E', is secured to the under side of the slide, and meshes with the third cog wheel B⁶. A crowning wedge, E², is secured upon the upper side of the slide and passes beneath the stave rest, raising or lowering the same, when the slide is reciprocated.

A post, F, slightly inclined toward the knife and stave rest, is adjustably secured by means of screw-bolts, f, inserted through a slot, e', in the slide, and a support, F', slides upon said inclined post. The side of the support facing the knife and stave rest has a supporting lip, f', upon which one end of the stave to be hollowed may be supported. One side of the sliding stave support has a roller, f'', journaled upon it, which roller engages and travels in a triangular groove, g, in a cam bracket, G, secured, longitudinally adjustable, upon the bed frame, by means of screw bolts, g', inserted through longitudinal slots, g'', in the foot of the bracket.

A loose pulley, H, revolves upon the drive shaft B, between two fast pulleys, H' and H'', upon the drive shaft, and a straight belt, I', and a cross belt, I'', pass respectively, around said fast pulleys and around a suitably driven power pulley, not shown. Two bell-cranks, h and h', having belt-shifting loops, h² and h³, are suitably pivoted above the pulleys and have said belts respectively passed through their loops. The bell cranks have studs, h⁴ and h⁵, upon their arms, which studs project into a slot, J, in a longitudinally sliding plate, J',—said slot having two straight longitudinal portions, j, and an oblique portion, j', connecting said straight portions.

A hand lever, K, is fulcrumed upon the side of the bed frame and has a connecting rod, K', pivoted to it, which rod is pivoted to an arm, K², pivoted upon the side of the bed frame. A connecting rod, K³, is pivoted to said arm and to the belt shifting plate J', so that said plate may be shifted into either one of the

extremes of its throw by rocking the hand lever or the arm K^2 . The arm K^2 has a short, outwardly curved lip, k , near its upper end, and a straight lip, k' ; both lips being upon the inner face of the arm, and the latter lip, k' , being near the inner, pivoted end of the arm.

The slide E has a plate, e^3 , secured upon its edge, which may strike the curved lip k and tilt the arm K^2 rearward at the end of the back stroke, and against the lower edge of which the curved lip k may bear at the forward portion of the stroke of the slide, so that the arm and hand lever cannot be thrown forward, at that portion of the stroke. A stop, e^3 , is adjustably secured upon the edge of the slide, near the rear end of the same, and may engage the lip k' upon the arm at the forward end of the stroke of the slide, so as to throw said arm into its forwardly tilted position and thereby reverse the forward stroke to a rearward stroke.

The machine is constructed to hollow staves which have been previously dressed, and in operation the stave to be hollowed is inserted with one end between the stave rest and the knife, and with the other end resting upon the supporting lip and against the stave support, said support being in its highest position, at the upper portion of the forward incline of the cam groove, when the slide is at the end of its back stroke. The slide carrying the stave support is now moved forward by starting the power pulley and by throwing the belts upon their proper pulley by means of the hand lever. As the stave is first presented inclined at an angle to the knife, the latter will bite into the stave, and, as the support gradually passes down, guided by the forwardly inclined groove, the stave will gradually arrive into a horizontal position and will be properly hollowed. The stave support will be forced upward by the wedge, toward the knife, and will regulate the depth of the hollow in the stave. When the slide arrives at the forward extreme of the stroke, one half of the length of the stave has been hollowed, and the stop upon the slide engages the rocking arm K^2 , and throws it over, moving the belt shifting plate and shifting the belts so as to reverse the motion of the slide. When the slide arrives at the rear portion of its stroke, the rear end of the stave is raised, by the support being raised by the inclined groove, and the stave may be removed and reversed, ready to have its other half hollowed at the next forward stroke. The plate e^3 will strike the curved lip k upon the arm K^2 , at the rear end of the back stroke and reverse the motion of the slide by moving the belt shifter.

The rounded edge of the stave rest and the rounded heel of the knife will allow the stave to be moved in a vertical plane, so as to follow any irregularities in the shape of the stave while the knife cuts the stave to an even thickness and to an evenly hollow shape. To

illustrate this feature, the stave shown in Fig. II of the drawings is illustrated as having an irregular shape.

The stave knife may be adjusted to hollow staves of varying thicknesses by removing or adding washers from or upon the bolts.

By the employment of the stationary, curved gouging knife, the staves are hollowed by a cut following the grain, such cut being like the cut of the ordinary drawing knife or stave-shave employed by coopers in dressing and hollowing staves by hand. Such drawing cut, with the grain of the wood is preferable to the cut of a rotary cutter which cuts with the grain or across the grain irrespective of the formation of the latter, thereby weakening a stave and rendering it unfit for tight work. It is necessary for staves intended for tight barrels to have their grain intact; as, if the grain is cut across at any part of the stave, the latter will be weakened at such point, and will be liable to break when it is bent and fitted into a barrel.

The length of stroke for the slide may be adjusted according to the length of the stave to be operated upon by adjusting the stop upon the slide, the cam bracket upon the frame, and the post upon the slide.

Other modes of applying the principle of my invention may be employed for the mode herein explained. Change may therefore be made as regards the mechanism herein set forth provided the principles of construction respectively recited in the following claims are employed.

I therefore particularly point out and distinctly claim as my invention—

1. In a machine for hollowing staves, the combination of a stave rest against which the outer side of the dressed stave may rest, a gouging knife arranged opposite and parallel to said stave rest to cut into the inner side of the stave, and means for forcing one of said elements toward the other, substantially as set forth.

2. In a machine for hollowing staves, the combination of a concave stave rest against which the convex side of the dressed stave may bear, a convex gouging knife arranged opposite and parallel to said stave rest to cut into the concave side of the stave, and means for forcing one of said elements toward the other, substantially as set forth.

3. In a machine for hollowing staves, the combination of a concave stave rest against which the convex side of the dressed stave may bear and formed with a convex rounded rear edge, with a convex gouging knife arranged opposite to said stave rest to cut into the concave side of the stave and formed with a rounded heel at its rear edge, substantially as set forth.

4. In a machine for hollowing staves, the combination of a stave rest, an opposed stave knife, a support for one end of the stave, and mechanism for forcing said support toward and from said rest and stave knife and simul-

taneously approaching and separating said rest toward and from said stave knife, substantially as set forth.

5 In a machine for hollowing staves, a stave rest against which the outerside of the dressed stave may rest, a gouging knife arranged opposite and parallel to said stave rest to cut into the inner side of the stave, and means for forcing one of said elements toward the other; 10 in combination with a stave support for the end of the stave to be hollowed and opposed to the cutting edge of the knife, and means for forcing the stave support,—as one part,—and the knife and stave rest,—as another 15 part,—one toward the other, substantially as set forth.

6. In a machine for hollowing staves, the combination of a rigid stave knife, an opposed, sliding stave rest, and a reciprocating slide 20 having a crowning wedge bearing against said rest, substantially as set forth.

7. In a machine for hollowing staves, the combination of two brackets having grooves in their inner faces, a stave knife secured at 25 the upper ends of said bracket, a stave rest sliding with its ends in the grooves in the brackets, and a reciprocating slide having a wedge bearing against the under side of the stave rest, substantially as set forth.

30 8. In a machine for hollowing staves, the combination of a stave knife and an opposed stave rest, with a post supported to be recip-

rocated toward and from the knife and rest, and a stave support sliding upon said post and having means for raising and lowering it 35 upon said post, substantially as set forth.

9. In a machine for hollowing staves, the combination of a stave knife and opposed stave rest, a slide having a post and having means for reciprocating it toward and from 40 the knife and rest, a stave support sliding upon said post and having a laterally projecting roller, and a cam bracket having a triangular groove for said roller, substantially as set forth. 45

10. In a machine for hollowing staves, the combination of a stave knife, an opposed stave rest, and a reciprocating stave support hav- 50 ing means for lowering it at its forward stroke, substantially as set forth.

11. In a machine for hollowing staves, the combination of a stave knife, an opposed stave rest, and a reciprocating stave support hav- 55 ing means for lowering it at its forward stroke and raising it at its back stroke, substantially as set forth.

In testimony that I claim the foregoing to be my invention I have hereunto set my hand this 26th day of August, A. D. 1892.

ARZA M. BENSON.

Witnesses:

WM. SECHER,
DAVID T. DAVIES,