

(No Model.)

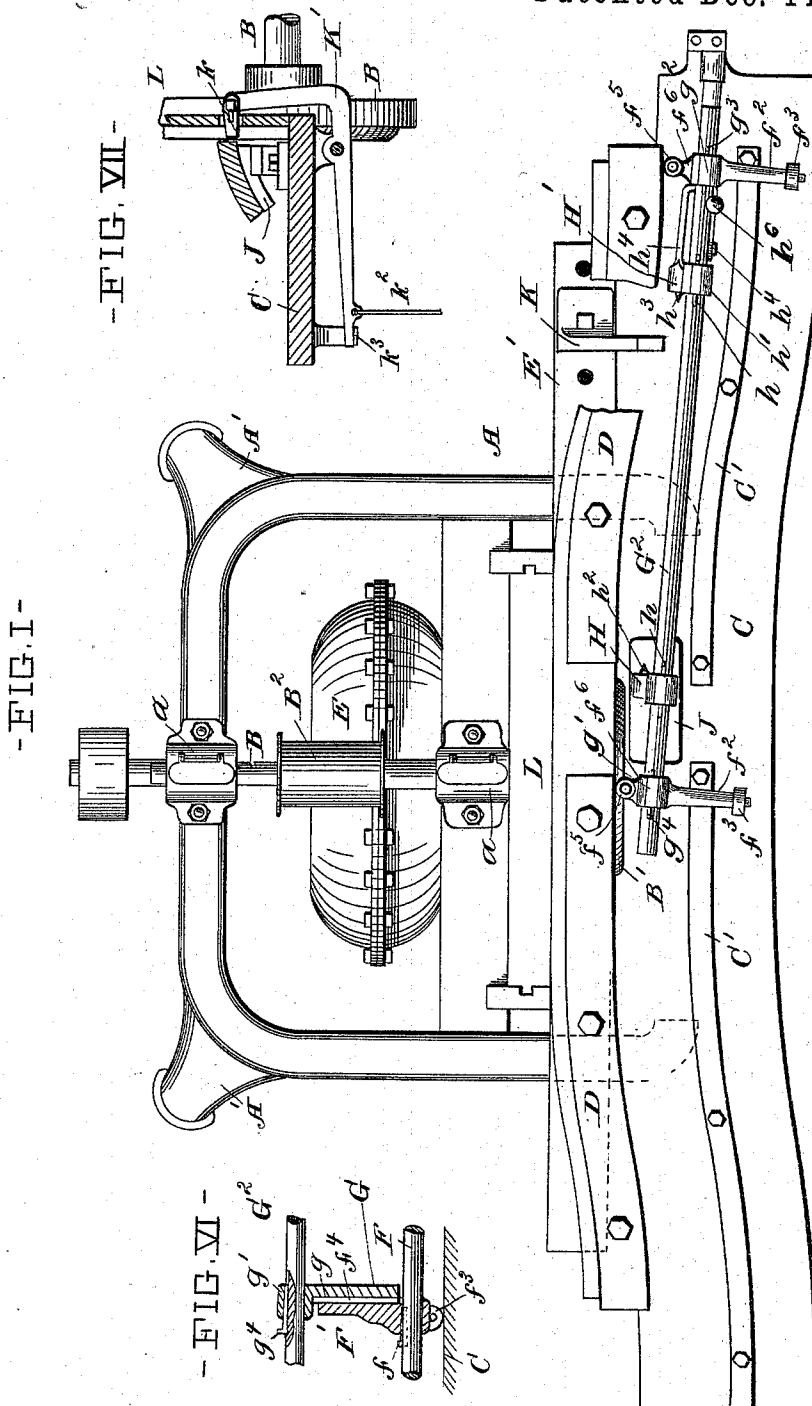
2 Sheets—Sheet 1.

A. M. BENSON.

MACHINE FOR JOINTING LISTED STAVES.

No. 530,500.

Patented Dec. 11, 1894.



(No Model.)

2 Sheets—Sheet 2.

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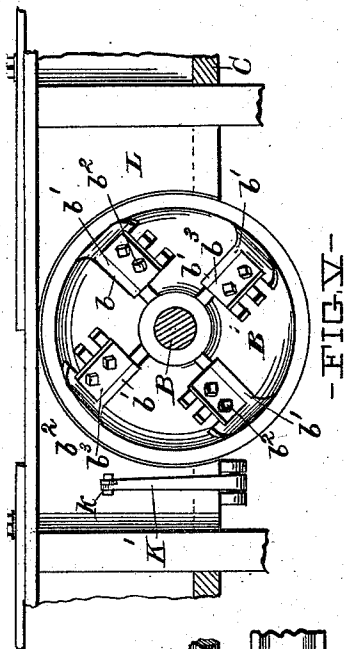


FIG. I.

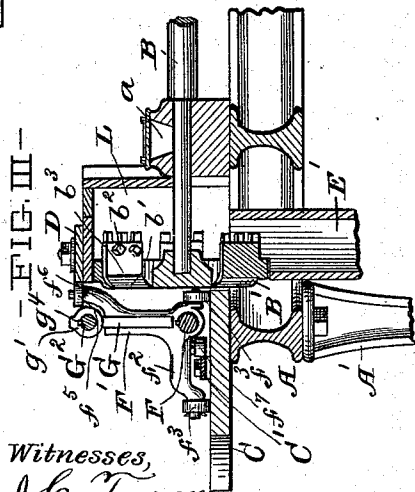


FIG. II.

Witnesses,
J. C. Turner
Jm. Lecher

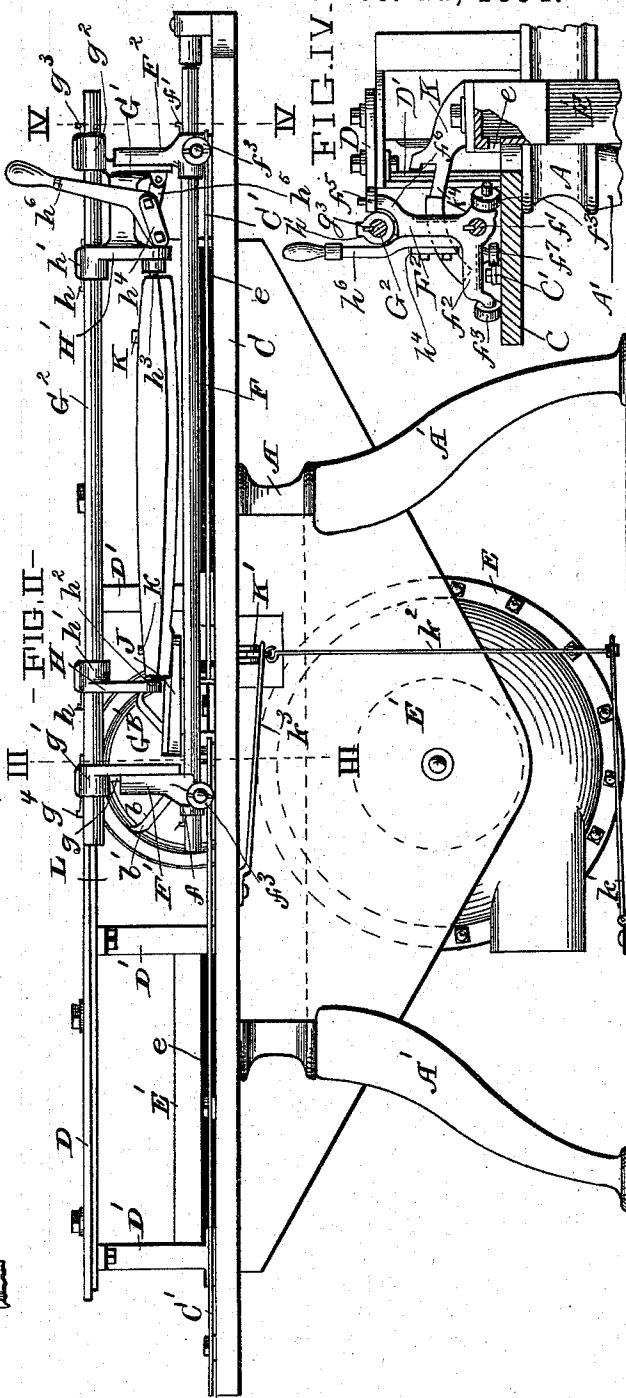


FIG. III.

Inventor,
A. M. Benson
by Hall & Fay attys.

UNITED STATES PATENT OFFICE.

ARZA M. BENSON, OF CLEVELAND, OHIO.

MACHINE FOR JOINTING LISTED STAVES.

SPECIFICATION forming part of Letters Patent No. 530,500, dated December 11, 1894.

Application filed April 2, 1894. Serial No. 505,997. (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 Jointing Listed 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 top plan view of my improved machine for jointing listed staves; Fig. II, a front view of the machine; Fig. III, a vertical transverse section, on the line III—III, in Fig. II, of the forward portion of the machine table, carriage and cutter disk; Fig. IV, a vertical transverse section, on the line IV—IV, in Fig. II, of the forward portion of the machine table and carriage; Fig. V, a rear view of the cutter disk; Fig. VI, a detail view of one end of the stave supporting carriage, and Fig. VII, a detail view of the movable gage.

The machine is mounted upon a frame, A, having legs, A'. A shaft, B, is journaled in transverse bearings, a, upon the middle of the frame, and has a forwardly bulged disk, B', upon its forward end, and a pulley, B², to which the power for driving it is applied. The disk has a number of radiating slots, b, having curved outer ends, and curved cutters, b', are secured to inclined faces upon the back of the disk so as to project at the front of the disk, with their curved portions substantially following the curve of the front of the disk, as most clearly illustrated by Figs. III and V. The cutters are slotted so as to be capable of adjustment upon their fastening bolts, b², to project more or less from the face of the disk, and the cutters are preferably clamped against the inclined faces by washer plates, b³, upon the bolts. The forward convexity of the disk will cause it to cut only with the cutters at one side of a ver-

tical line through its center, when a stave is moved along with one edge presented to the disk. The curved outer portions of the cutter edges serve to cut the chips free from the wood of the stave, so that there shall be no splitting of the wood into the edge of the stave, beyond the line of which the edge of the stave is to be trimmed.

A table, C, is supported upon the machine frame to extend at both sides of the cutter disk for the reception of which its rear edge is slightly cut away. The table is preferably curved to correspond to the shape of the guides which guide the carriage, upon which the stave is supported, in its relation to the cutter disk. Guide rails, C', are detachably secured to the upper surface of the table, a space being left between their inner ends, opposite the center of the cutter disk. The guiderails are of such shape,—having straight and curved portions, that they will guide the stave carriage relatively to the cutter, in such a manner that the edge of the stave will be evenly trimmed and in the proper shape. The guides are detachably secured upon the table so that guides corresponding to different sizes and shapes of staves may be interchangeably employed in the same machine. Upper guide rails, D, are detachably secured to upright brackets, D', extending from the rear edge of the table, and said upper guides correspond in shape to the shape of the lower guides, and are detachable so as to be interchangeable with others for the same reason as stated regarding the lower guides.

A fan, E, is arranged in the frame beneath the table, and the suction opening of said fan opens into a shavings box, E', extending to the rear edge of the table, at both sides of the cutter disk, where it has a suction slot, e, through which the shavings, flying from the rapidly revolving cutters, may be drawn into the box, to be delivered to the fan, and by the latter be conveyed away from the machine.

The stave is supported in a carriage which is guided by the guide rails, and in which the stave may have movement in a vertical plane, and pivotal movement upon its longitudinal axis. The carriage has a longitudinal bottom rod, F, to which two uprights, F' and F², are adjustably secured by means of keys, f and f', respectively. Each upright is formed with

a horizontal base piece, f^2 , having two rollers, f^3 , which travel upon the upper surface of the table,—one near the rear edge of the latter, and one a distance forward of the lower guide rails. Guide rollers, f^7 , are horizontally journaled upon the base pieces, to travel against the inner or rear edges of the lower guide rails. The facing sides of the uprights are formed with vertical grooves, f^4 , and slides, G and G' , have tongues, g , which fit and slide in said grooves. The forward slide G ,—or the slide which is foremost during the operative movement of the carriage,—has a horizontal eye, g' , in which the forward end of a top rod, G^2 , of the carriage is adjustably secured by means of a key, g^4 . The rear slide G' , has a similar horizontal eye, g^2 , in which the top rod is adjustably secured by means of a key, g^3 . Guide rollers, f^5 , are journaled to horizontally revolve upon brackets, f^6 , projecting from the upper ends of the uprights, and said rollers bear against the forward edges of the upper guide rails, so that the uprights are perfectly guided between the lower and upper guide rails and will truly travel in the desired track. Brackets, H and H' , are adjustably secured to the top rod by keys, h , in horizontal eyes, h' , in the upper ends of the brackets, and said brackets hang downward from the top rod. A stationary pivot bolt, h^2 , is horizontally secured in the lower end of the forward bracket H , and serves as a pivotal support for the forward end of the stave. A longitudinally movable pivot bolt, h^3 , slides in the lower end of the rear bracket H' , and has one end of a toggle arm, h^4 , pivoted to it. The opposite end of said toggle arm is pivoted to a toggle arm, h^5 , the rear end of which is pivoted to the rear slide, G' , and the arm h^4 has an upwardly projecting handle, h^6 , by means of which the toggle arms may be flexed or straightened, and the movable pivot moved back or forward.

A guide rest, J , or stave guide, is secured upon the table in front of the center of the cutter disk, and is inclined toward the front of the table and toward the starting point of the carriage, so that the stave may ride over said guide and be longitudinally raised and transversely tilted forward, that the cutters may give the proper joint to the stave and the stave may at all times be presented to the cutters in the proper position, regardless of whatever twisted formation the stave may have. The guide is detachably secured to the table, so that the other guides of different inclinations may be substituted for it,—such interchangeability being necessary to render one machine capable of use for staves of different sizes and shapes.

A stationary gage, K , is adjustably secured upon the top of the shavings box, near the rear or starting end of the table, and serves to gage the position of the stave in the carriage the edge of the stave being placed against the forwardly projecting end k^1 , of the gage, such as illustrated in Fig. IV of the drawings.

A movable gage is formed by a forwardly projecting, adjustable bar, k , upon the upper end of an L-shaped lever, K' , which is pivoted at its elbow beneath the table, and has a treadle, k' , connected to its forward arm by means of a rod, k^2 . A spring, k^3 , bears upward against the forward arm of the gage lever, so as to withdraw the gage when pressure upon the treadle is released.

A box, L , covers the cutter disk, and communicates at its bottom with the shavings box.

In practice, the guide rails which fit the particular size and shape of staves to be treated, are secured in place. The appropriate stave guide rest is secured in place. The stationary gage is adjusted at the proper place, so as to bring the axial line of the stave opposite the movable pivot bolt, and the adjustable bar upon the movable gage lever is adjusted so as to bring the other end of the axial line of the stave opposite the rigid pivot bolt. Instead of having an adjustable bar at the upper end of the movable gage lever, interchangeable levers may be made with gages of different lengths, or other means may be provided for rendering the gage adjustable. The staves to be treated have previously been dressed, hollowed and listed, so that they are of even width at both ends. A stave may now be placed in the carriage, which has been brought to its starting position, and the uprights and brackets of which have been adjusted to hold the desired length of stave. The treadle for the movable gage is depressed, and the edge of the stave is brought to bear against the two gages, which will bring the ends of the axial line of the stave into position opposite the pivot bolts. The movable pivot bolt is forced against the rear end of the stave and is locked in position by the lever of the toggle arm. When now the cutter disk is revolved, and the carriage is pushed forward, the stave will ride over the stave guide rest, at the proper angle to the cutters, and will be capable of vertical movement on account of the vertically movable slides in the carriage, and of transverse movement, being supported upon the points of the pivot bolts. The edge of the stave will be trimmed or jointed in the proper manner by the revolving cutters. The vertical and transverse movability of the stave in the carriage, and the oblique guide and support which the stave has as it rides over the inclined stave guide rest, admits of twisted staves being jointed or trimmed to their proper shape with as much accuracy as perfectly straight staves. This latter feature is the leading feature in my machine, and the principal object of my machine. Staves for tight barrels and casks are now usually rived, dressed and hollowed by cutting means which follow the grain of the wood, splitting the staves from the bolt with the grain, instead of cutting straight cuts with or obliquely across the grain, according to the way the grain runs.

When staves are treated by hand, the draw

knife can follow all the twists of the grain, but when staves are treated by machinery, the cutting tools will cut along the grain and across the grain in one set line, if the staves are rigidly supported. This will weaken the staves, if the grain is twisted, and would thus render machine treatment of wood with twisted grain impractical. Machines for dressing and hollowing twisted staves are made and used, but the jointing machines generally used, do not properly joint a twisted stave, as the stave is rigidly supported. If twisted staves are treated on my machine after they have previously been listed by another machine, their edges will be so jointed or trimmed, that they will form perfect joints when the staves are set up and hooped, and, consequently, straightened.

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 thus disclosed, provided the principles of construction set forth respectively in the following claims are employed.

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

1. In a machine for jointing listed staves, the combination of a cutter arranged to operate in a vertical plane, a carriage movable in a path adjoining said cutter, vertically movable slides in said carriage, horizontal pivot points supported from said slides and adapted to engage both ends of the stave to be jointed, and a guide rest over which the stave may ride and be presented to the cutter at the proper angle, substantially as set forth.

2. In a machine for jointing listed staves, a stave carriage consisting of two uprights provided with means for guiding them in the desired path, a rod passed through the lower portions of said uprights and upon which the latter are adjustably secured, vertically guided slides upon the uprights, a rod passed through the upper ends of said slides and upon which the latter are adjustably secured, brackets adjustably secured upon said rod, a stationary pivot point horizontally projecting from one bracket, and a horizontally movable pivot point in the opposite bracket and having means for moving and locking it, substantially as set forth.

3. In a machine for jointing listed staves, a stave carriage consisting of two uprights provided with means for guiding them in the desired path, a rod passed through the lower portions of said uprights and upon which the latter are adjustably secured, vertically guided slides upon the uprights, a rod passed through the upper ends of said slides and upon which the latter are adjustably secured, brackets adjustably secured upon said rod, a stationary pivot point horizontally projecting from one bracket, and opposed and horizontally movable pivot point in the other bracket, a toggle arm pivoted to the vertical slide, and a toggle arm pivoted to said other toggle arm and to

the pivot point and having a handle for manipulating it, substantially as set forth.

4. In a machine for jointing listed staves, the combination of a cutter, a carriage movable in a path adjoining said cutter and having means for supporting a stave to have movement in a plane parallel to the cutting plane of the cutter and to rock transversely to such plane, a stationary guide rest over which the stave may ride and inclined outwardly from the cutter and toward the starting point of the carriage, a stationary gage for the edge of the stave arranged near the starting point of the carriage, and a movable gage for the edge of the stave and arranged near the cutter, substantially as set forth.

5. In a machine for jointing listed staves, the combination of a table, a cutter in a plane at right angles to said table, a carriage traveling upon said table and provided with guide rollers revolving in the plane of the table and with pivot points for the ends of the stave and supported to have movement in a plane at right angles to the plane of the table, curved guide rails against which the guide rollers may travel, and an outwardly inclined and stationary stave guide rest over which the stave may ride and having an incline toward the starting point of the carriage, substantially as set forth.

6. In a machine for jointing listed staves, the combination of a horizontal table, curved guide rails upon said table, correspondingly shaped guide rails supported upon brackets above said table, a vertically revolving cutter disk having cutting edges upon its face and arranged against the middle of the inner edge of the table, uprights having rollers which travel upon the table and having horizontally revolving rollers which bear against the opposite edges of the guide rails, a rod connecting said uprights, slides guided to move vertically upon the uprights, a rod connecting the upper ends of said slides, downwardly projecting brackets secured upon said rod, a stationary pivot point in the lower end of one of said brackets, a horizontally movable pivot bolt in the lower end of the other bracket, toggle arms connected to the end of said bolt and to the lower end of the slide and having a lever projecting from one arm, a stave guide rest secured at the middle of the table at about the center of the cutter disk and having an incline toward one end of the table and inclined outward from the cutter disk, a stationary gage near one end of the table, and a movable gage near the cutter disk having means for retracting it out of the path of the stave, substantially as set forth.

In testimony that I claim the foregoing to be my invention I have hereunto set my hand this 31st day of March, A. D. 1894.

ARZA M. BENSON.

Witnesses:

WM. SECHER,
DAVID T. DAVIES.

It is hereby certified that in Letters Patent No. 530,500, granted December 11, 1894, upon the application of Arza M. Benson, of Cleveland, Ohio, for an improvement in "Machines for Jointing Listed Staves," errors appear in the printed specification requiring correction as follows: In line 59, page 1, the word "of" preceding the word "which" should read *to*; line 64, page 3, the word "and" should read *an*, and in line 104, same page, the word "and" should be stricken out; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 18th day of December, A. D. 1894.

[SEAL.]

JNO. M. REYNOLDS,
Assistant Secretary of the Interior.

Countersigned:

JOHN S. SEYMOUR,
Commissioner of Patents.