J. NAYLOR, Jr., & P. VOLLMAR.

Stave Jointing Machine.

No. 197,394. **Patented Nov. 20, 1877.**

Fig. 1.

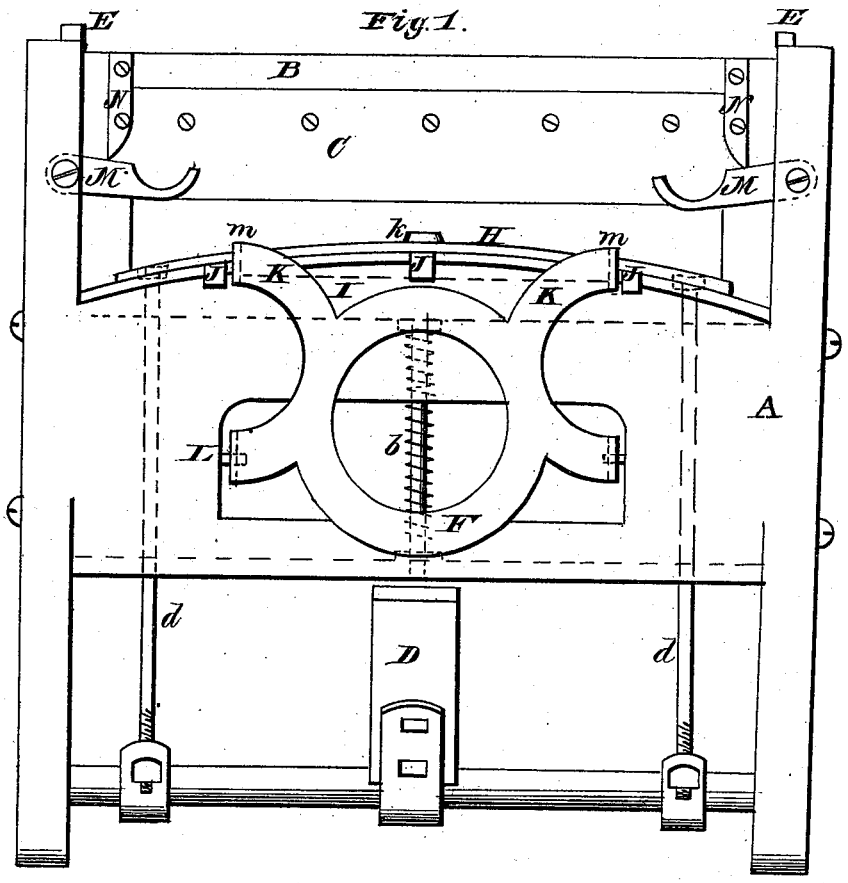
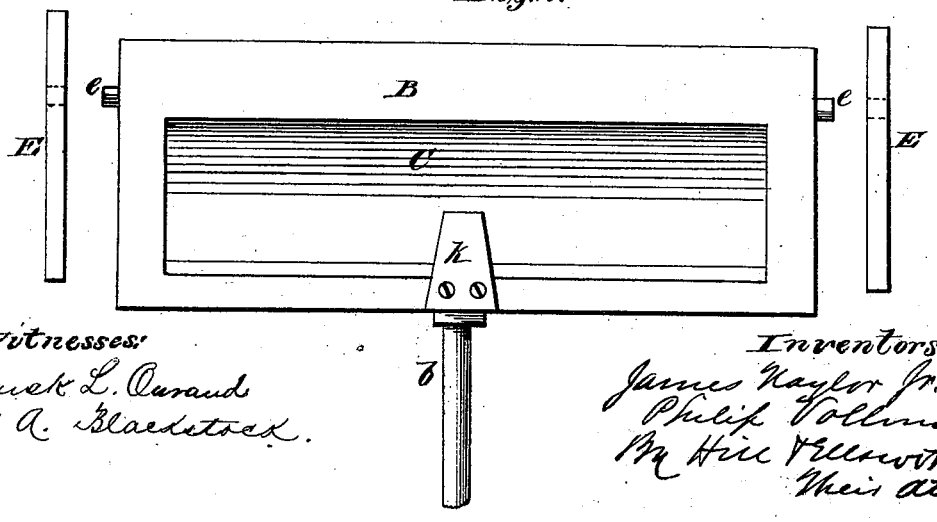


Fig. 2.



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2 Sheets—Sheet 2.

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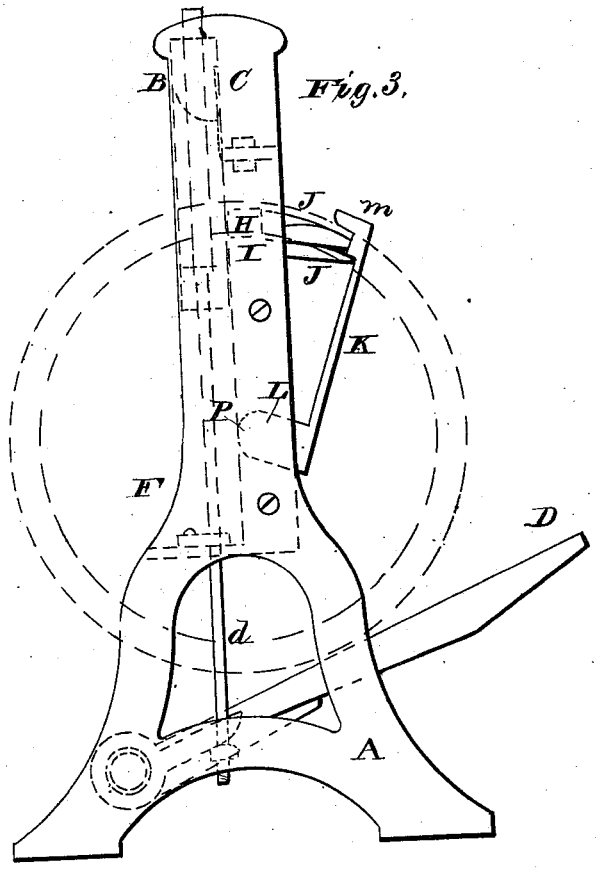

Fig. 3.

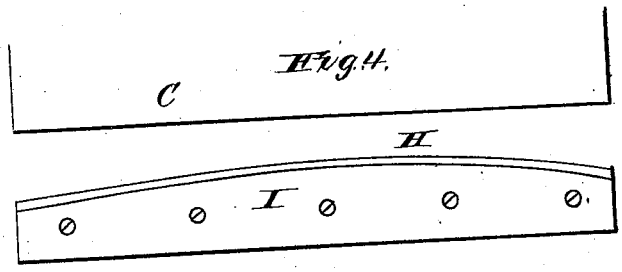

Fig. 4.

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UNITED STATES PATENT OFFICE.

JAMES NAYLOR, JR., OF ROCHESTER, NEW YORK, AND PHILIP VOLLMAR, OF SEAFORTH, ONTARIO, CANADA.

IMPROVEMENT IN STAVE-JOINTING MACHINES.

Specification forming part of Letters Patent No. **197,394**, dated November 20, 1877; application filed August 31, 1877.

To all whom it may concern:

Be it known that we, JAMES NAYLOR, Jr., of the city of Rochester, in the county of Monroe and State of New York, and PHILIP VOLLMAR, of the town of Seaforth, in the county of Huron and Province of Ontario, Canada, have invented a certain new and useful Improvement in Stave-Jointers; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation; Fig. 2, an elevation of the knife-bed and component parts, as taken from Fig. 1 and reversed; Fig. 3, a side elevation; and Fig. 4, an elevation to show more clearly the arrangement of the knife, bed-piece, and form.

We wish it to be understood that we confine ourselves solely to that class of stave-jointers commonly known as "foot-jointers," and disclaiming that any part of our invention has any relation to what is known as the "wheel stave-jointer."

The invention consists in the combination and arrangement of parts in such manner that staves are jointed perfectly according to their width, and also receiving the full inside joint, so essential to the making of good barrels.

The staves are pressed, in the manner hereinafter described, into a peculiar shape, and while so pressed are jointed.

Here it must be borne in mind that, although staves are cut on a certain circle, by piling and drying they get flattened out.

We are aware that experiments have been tried, and doubtless patents granted, for inventions based on this same principle, all of which have proved unsuccessful when brought to actual use.

Before proceeding to describe our invention and its operation, it will be meet here to explain the present almost universal method of jointing, in order to more readily see and comprehend the superiority of our improvement.

The stave is laid flat on a bed-piece, which is curved on its edge to a required bilge. The knife-edge tapers to both ends, and is also curved to coincide with the bed-piece. Every stave is therefore by this means jointed alike, regardless of its width, and great care and judgment must be exercised in setting up such staves to form barrels; whereas, by the means and in the manner hereinafter described staves are jointed, and barrels formed with such staves have the bilge always uniform, regardless of the number to a barrel, which in the other case must necessarily be a given number to obtain the same bilge.

Referring to the accompanying drawings, A represents the frame-work of the machine; B, the knife-bed, to which, firmly attached, is the straight edged and faced knife C, said knife and bed receiving a vertical movement from the foot-lever D through the medium of the connecting-rods *d d*.

Part of our invention consists in keeping this vertical movement in close working order, notwithstanding the frame-work may be sprung or twisted by its standing on two opposite feet instead of all four, which is too often the case in the using of these machines.

E E are slides working freely in the frame-work, and here can be given much bearing-surface to prevent wear. Said slides are pivoted to the knife-bed B at *e e*, (see Fig. 2,) thus severing the torsional connection and rendering it impossible for the slides E E to bind in the ways one against another.

The knife-bed B has the slide-shaft *b* secured to it, and which is part of it, said slide-shaft working freely through the lower guide F, which is adjustable, thereby allowing the knife C to be easily set to the bed-piece H, the pivots *e e* of the slides E E being placed somewhat above the edge of the knife C. (See Fig. 2.)

There is an open spiral spring around the slide-shaft *b*, which serves to more than counterbalance the knife and component parts. The upper end of this spring presses against the knife-bed B, and the lower against the lower guide F resting on and secured to the frame-work.

H is the bed-piece on which the stave is placed, and consists of a flexible bar having its upper surface coinciding with the inner circular surface of a barrel. This bed-piece is securely bolted over the form I, (see Fig. 4,) which can be replaced or otherwise altered when a different bilge is required.

It will be necessary here to state that the

bed-piece H, being bent over these various forms, always maintains a straight edge to the knife.

In ordinary machines the knife must be altered the same as the bed-piece.

J J J are ribs having their upper surfaces coinciding as the bed-piece to the inner circular surface of a barrel. These ribs are only to facilitate placing the stave.

K K are gages for keeping the stave, by the aid of the spring *k*, parallel to the knife C, and are provided with the offsets *m m* for the purpose of holding the stave down, and at its correct position on its outside edge, while the jointing is being done, said gages and offsets being pivoted at L, (see Fig. 3,) the supposed center of a barrel. The ribs J J J and the bed-piece H are laid out from this same center, so that the gages K K and offsets *m m* move concentric to them.

M M are cams attached and working freely to the frame-work, and are counterbalanced in such manner that said cams are kept up against the projections N N of the knife-bed B, said projections operating on the cams M M in such manner that the stave is first bent over the bed-piece H, and before the knife is through the stave at the center it is securely held by said cams, which retain it during the rest of the operation.

The operation is as follows: The stave to be jointed is placed on the bed-piece H and ribs J J J. The gages K K are brought to bear against the outside edge, the spring *k* pressing against the edge to be cut. The stave is now presented parallel to the knife C, and more or less can be cut off, as is required, the spring *k* yielding sufficiently for this purpose. The offsets *m m* overlap the outside edge, thereby holding it in place. Pressure upon the foot-lever D causes the downward movement of the knife-bed B, which first operates on the cams M M by the projections N N of the knife-bed B, said cams pressing down the stave at each end before the jointing commences, and is so held until completed, after which the stave is gradually released and the operation completed.

It is evident that all joints in a barrel must be parallel to the central axis of said barrel, and also tend to its center. This is a perfect geometrical joint; but in actual working this is not what is wanted, a fullness on the inside being required to give the barrel its rotundity in trussing and hooping. The main part of our invention consists in accomplishing this result, reference now being had to Fig. 3. The line of the knife, instead of tending to the center of barrel at P, (which would be the case in cutting the perfect geometrical joint,) is off from it, and to maintain the vertical movement of the knife-bed the center is placed at L, which has the effect of raising the ribs J J J on the outside, and somewhat lowers the edge of the bed-piece H to the movement of the knife. Here it may be observed that the width of the bed-piece H is double the distance of the two centers P and L; therefore the bed-piece can be made of a rectangular bar, and will always maintain the correct shape and form on its two edges. When the bilge or curve of the bed-piece is the same as the bilge or curve of a barrel, it will be found to be incorrect; but this is remedied by bending the bed-piece over forms more curved until the desired bilge is obtained, as it is evident that the farther down the ends of staves are forced the farther will the ends protrude over the cutting-edge of the bed-piece.

Having thus described our invention, we do not claim jointing according to the geometrical principle, as hereinbefore explained; but we do claim the essential differences which produce such satisfactory results, combined with the improvement in the general working and the economical production of this class of stave-jointer.

We claim as our invention—

1. In a machine for jointing staves, the combination of the flexible bed-piece H with the form I, and the straight edged and faced knife C, arranged and operating in the manner as herein shown and described.

2. The gages K K, oscillating at L, the imaginary center of the barrel, and having the offsets *m m* for holding the stave securely on its bed, substantially as described.

3. The knife-bed B, having projections N N, in combination with the cams M M, constructed in the manner and for the purpose specified.

4. The combination of the knife-bed B, of the pivoted slides E E, of the lower guide F, all arranged substantially in the manner as herein shown and described, and for the purpose specified.

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