S. S. Gray,

Stave Jointer.

No. 107,678. Patented Sept. 27, 1870

Fig. 1.

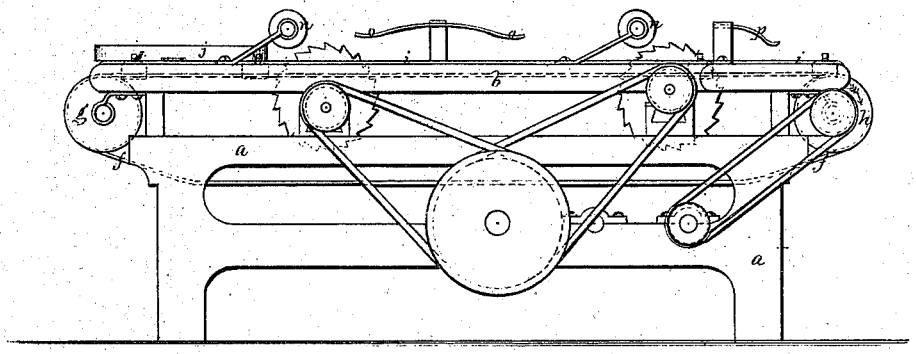


Fig. 2.

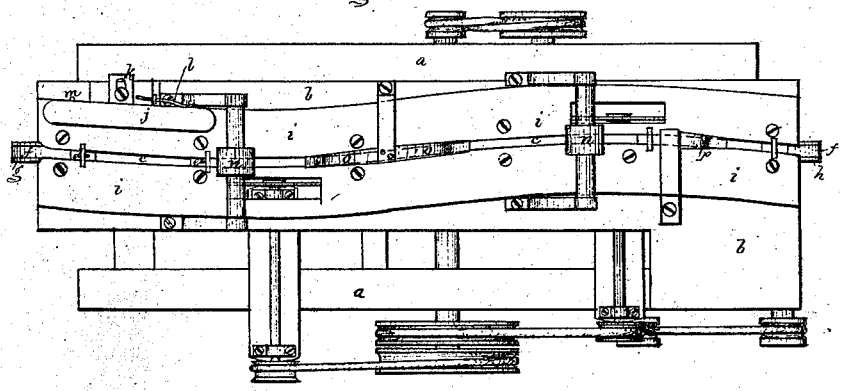
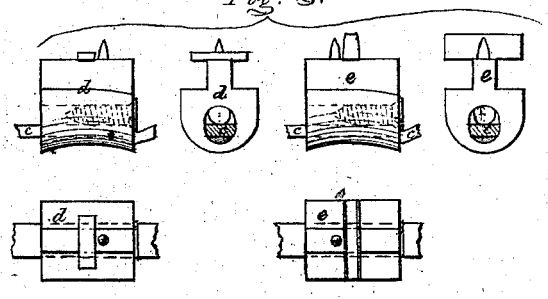


Fig. 3.



Witnesses { W. B. Crosby, Francis Gould

Solomon S. Gray

United States Patent Office.

SOLOMON S. GRAY, OF BOSTON, MASSACHUSETTS.

Letters Patent No. 107,678, dated September 27, 1870.

IMPROVEMENT IN MACHINES FOR JOINTING STAVES.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, SOLOMON S. GRAY, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Machines for Jointing the Edges of Staves to the desired shape; and I do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

This machine is designed to operate upon staves, (after they have been made convex on one surface, and concave on the other, and are cut to the proper length, and beveled and crozed at the ends,) to give to the edges of the staves the proper curvatures and bevels needed to make perfectly tight joints with each other, when a set is arranged together to form a barrel or cask.

My invention consists in the combination, with saws arranged to cut stave-edges in directions substantially radial to the longitudinal axes of the barrels or casks to be formed threfrom, of means for carrying or feeding each stave in a curved path, adapted to perfectly joint or shape, by the operation of two saws, each edge of each stave subjected to the action of the machine.

It further consists in a rest or gauge, which is arranged so as to yield, to permit the stave to move in a curvilinear path past the gauge, and to return to its normal position, so as to gauge the position of a stave-blank on the device employed to feed it to the action of the saw.

And it also consists in the combination of pressers with a curvilinear guide-path, and the conveyers moving therein, so that the staves may be kept upon said conveyers during the time in which they are subjected to the action of the saws.

Figure 1 of the drawing represents my improved machine in side elevation; and

Figure 2, in plan.

A suitable frame, *a*, is made, having a top, *b*, on or in which is located a curvilinear guide-path, *c*, in which are fitted the conveyers *d* and *e*, seen in detail in fig. 3.

These conveyers are adjustably attached to an endless band, *f*, which, in practice, is preferably made as a chain, which passes at the ends of the machine over wheels *g* and *h*, the latter of which is driven in the direction of the arrow marked thereupon, by any suitable means, at any desired speed, and one or both of said wheels are made adjustable in position, so that the band passing over them may be tightened when required.

The guide-path *c* is preferably made by strips of metal, *i i*, with their adjacent edges suitably curved, and set at a uniform distance apart, said edges projecting over a groove formed in the top *b*, of sufficient size to freely permit the passage of the band *f*, and those parts of the conveyers *d* and *e*, by which they are secured to the band. The conveyers are closely fitted between the edges of the strips *i i*, and have projections which bear on the top surface of said strips.

On the frame *a* are located bearings for circular saws, so arranged that the saws will be in the radial planes needed to form the edge joint-surfaces of the staves, and, in practice, I make provision for adjustment of said bearings to suit the stave-edges to the angle or bevel needed for barrels or casks of different diameters. These saws are to be rotated rapidly, so as to cut, as is usual, against the advancing staves, one saw forming one edge, and the other the other edge of each stave in succession, the saws being driven in any suitable known way.

The conveyers *d* and *e* may be varied in form, and in the way in which they are connected to the band *f*, but, however made, they should be removable from the band, so that others may be adjusted thereon, to suit staves with wide or narrow crozings, and should be relatively adjustable thereon, to suit staves of different lengths.

The leading conveyer *e* has a flange, 1, which is fitted in size and form to the shape of the croze in the stave end, and with a spur, which keeps the stave from lateral movement on said flange, the under surface of which bears on the upper surface of the strips *i i*, while the neck 2 of the conveyer fits the space between the edges of said strips.

The conveyer *d* is similar to *e*, except that the piece which rests on the top surface of strips *i i* need not fill the croze in the other end of the stave. In each conveyer a spur is needed to prevent lateral movement of the staves. Two or more sets of conveyers are used upon the band, as may be found suited to the dexterity of the operator, and the rate of cut made by the saws.

The guide-path is a double curve or ogee, which, in length, is about four times the length of the stave to be sawed, and each saw is set with its cutting-part at or near the middle ordinate of the curve of the adjacent part of the path, the saw being also set tangential to a curve made parallel with the guide-path, so that it will be seen that the stave-body, in its advance, moves away from the saw which is making its cut, while the strips which are cut from the stave-blanks are so thin and flexible that they bend and break off from the saw, without giving any practical annoyance. The saw-bearings, in practice, may be adjusted toward and from the guide-path, within the slight limits which may be needed to vary the width of the staves.

At the front end of the machine is placed a guide or rest, *j*, with its face at each end equally distant from the guide-path, and at a distance from the cen-

ter of said path a little greater than half the width of the stave-blank.

This guide is pivoted to an adjustable slide, *k*, so that its end, nearest the first saw, can yield away from the saw, as the stave-blank is carried onward.

The spring *l* tends to keep the guide pressed against a stop-pin, *m*, so that when the last end of a stave-blank passes the first saw, the spring returns the guide to its normal position, to be used as the gauge by which the next stave-blank is set by the operator properly on the conveyers.

When the first conveyer *e* presents itself above the strips *i i*, the operator places a stave-blank against the operative face of gauge *j*, and drops the croze of the advanced end over the flange 1, and as the conveyer *a* appears, he lowers the other end of the blank thereupon, pressing the blank upon the spurs in both conveyers.

Just ahead of the cutting-part of each saw is placed a yielding presser, *n*, while between the saws is located a yielding presser, *o*, and there is also, behind the last saw, another yielding presser, *p*, the function of all of the said pressers being to keep the stave properly in place upon the conveyers under the action of the saws.

This machine operates to joint, by means of the saws, first one and then the other edge of staves as fast as the blanks can be placed by the operator upon the conveyers, and performs its work so that the joints in barrels and casks, made up with staves prepared by the described machine, are liquid-tight. No attendant is needed at the rear end of the machine, as the staves are automatically discharged from the conveyers, as they pass over the wheel *h*, on their way to receive a fresh stave-blank.

I claim—

In a machine for jointing staves suitably for forming barrels, or other vessels with a bilge, the combination, with oppositely-inclined saws, of a double curved guide and conveyers, *d e*, operating in continuous succession, substantially as described.

Also, in combination with the curved guide and saw, the spring-pivoted guide or gauge.

Also, yielding pressers, in combination with the matter first claimed.

SOLOMON S. GRAY.

Witnesses:

J. B. CROSBY,

FRANCIS GOULD.