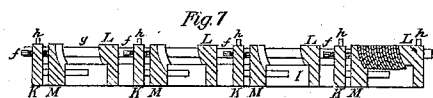
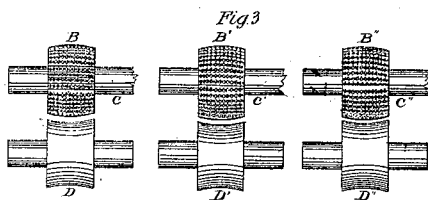
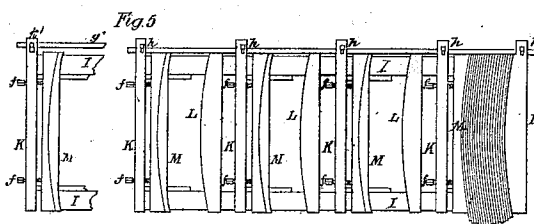
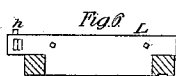
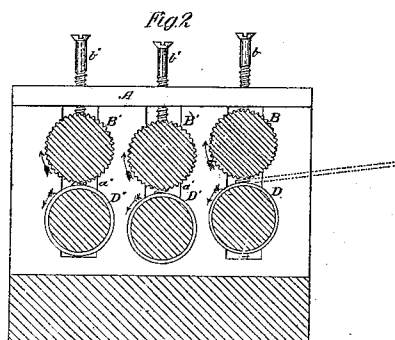
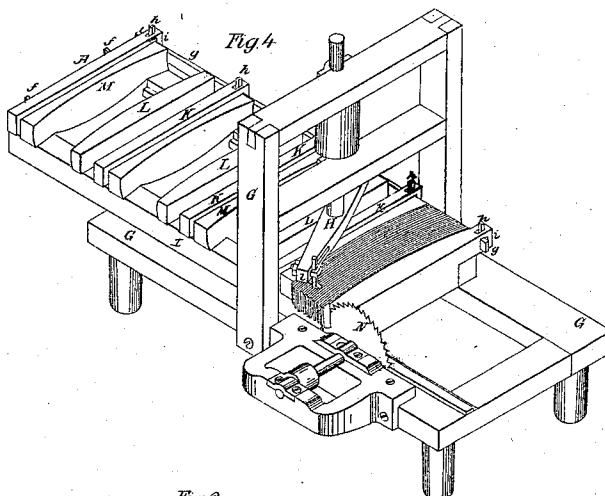
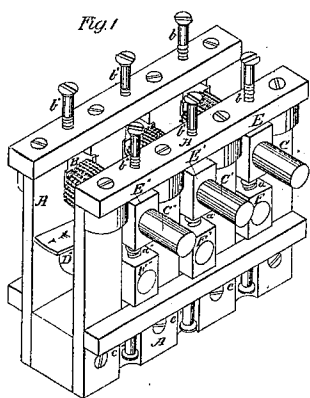


G. W. LIVERMORE.  
BARREL MACHINE.

No 10,680.

Patented Mar. 21, 1854.



# UNITED STATES PATENT OFFICE.

GEO. W. LIVERMORE, OF CAMBRIDGEPORT, MASSACHUSETTS.

## MACHINERY FOR MAKING BARRELS.

Specification of Letters Patent No. 10,680, dated March 21, 1854.

*To all whom it may concern:*

Be it known that I, GEORGE W. LIVERMORE, of Cambridgeport, in the county of Middlesex and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Machinery for Making Barrels and other Casks; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is an isometric view of the machine for forming the staves; Fig. 2, a section through the same; Fig. 3, a front view of the rollers detached from their bearings. Fig. 4 is an isometric view of the machine for jointing the staves and for reducing them to an uniform length. Fig. 5 is a plan of the carriage of the above machine in which the staves are clamped preparatory to being jointed. Fig. 6 is an end view of the same. Fig. 7 is a longitudinal section through the same. Fig. 8 is an isometric view of the machine for crozing and chamfering the staves. Fig. 9 is a section through the same. Fig. 10 is a view of the chamfering and crozing cutters detached from the machine. Fig. 11 represents the manner in which the staves are set up to form the cask. Fig. 12 is a longitudinal section through the machine employed for this purpose. Fig. 13 is the machine for driving the hoops after the barrel is set up.

The first part of my invention consists in passing the stave blanks between grooved or toothed rollers so arranged with respect to each other and so curved upon their surfaces as to give to the staves the required shape, the action of the rollers at the same time so compressing the wood that the shape given to them is permanently retained.

My second improvement consists in the peculiar construction of the carriage of the jointing machine which will be hereafter described, by which I am enabled simultaneously to joint a large number of staves and to reduce them to the length required.

My third improvement consists in placing a cone or frustum of a cone over the barrel, upon which cone the hoops are placed, being afterward driven upon the barrel by a gang of "drivers" attached to a suitable shaft which is caused to descend by a lever or cam, operated by hand or by their own weight.

To enable others skilled in the art to make

and use my improvements, I will proceed to describe their nature and operation.

The lumber of which my staves are to be formed, having been sawed of the requisite thickness and planed upon one or both sides, is slit into blanks of an uniform width and length. These blanks are then passed through the machine represented in Figs. 1, 2 and 3, which is constructed as follows: A is the framework of the machine of a strength sufficient to endure the strain upon the operating parts.

B, B', B'', are convex toothed rollers which are driven in any suitable manner by power applied to their shafts C, C', C''. The first of these rollers B or that which first receives the stave blank is but slightly curved. The curve of the next roller B' has a shorter radius, and the last B'' is more curved than either of the other two. D, D', D'', are concave rollers smooth upon their surface placed immediately beneath the rollers B, B', B'', as seen in Fig. 2 and having their surfaces curved to correspond with the curve of the upper rollers as seen in Fig. 3. The rollers B, B', B'', run in boxes E, E', E'', and the lower series of rollers in the boxes F, F', F''. These boxes are kept separate from each other by the springs a, a', a'', the boxes of the upper rollers being forced down by the set screws b, b', b'', and those of the lower ones forced up by the set screws c, c', c'', for the purpose of adjusting the distance between the rollers to the thickness of the blank to be run through them.

The transverse curvature of the stave is given by the convexity of the rollers B, B', B'', while they are curved longitudinally by the following device: The boxes E' and F' which carry the middle pair of the series of rollers are depressed by means of their adjusting screws b' and c', beneath the level of those which carry the two outside pair of rollers. The toothed rollers B, B', B'', being driven by power suitably applied to their shafts, the stave blanks prepared as before described of an uniform and unvarying thickness and width, are presented one by one to the first pair of rollers B, D, as represented by dotted lines in Fig. 2. The blank being seized by these rollers is passed through to the next pair B', D', and so on between the last pair of rollers B'', D'', out of the machine. It is found that staves thus treated may be put into the exact shape

required, even though the blanks are of the most refractory, knotty and well seasoned oak. By depressing on raising the middle set of rollers, the longitudinal curvature of the stave may be varied at pleasure. The transverse curvature can be varied by changing the last pair of rollers of the series. Whatever may be the state of the lumber whether seasoned or green when the staves are run through the above machine, the shape then given to them is retained, while their strength is not in the least impaired by the crimping or pressing to which they are subjected. It is obvious that a greater number of rollers than is above represented may sometimes be required for casks of large dimensions or for some species of lumber; in most cases however it will be found that three pairs of rollers will be sufficient. The staves are next taken to the machine represented in Figs. 4, 5, 6, and 7, where they are jointed and reduced to the length required in the following manner.

G is the framework of an ordinary "Daniels planing machine," H the cutter head, and I a clamp carriage which slides upon the frame G, being guided by the tongue *d* which enters the groove *e* in the bottom timber of the carriage. This carriage is composed of a series of clamps for the purpose of holding the staves, during the operation of jointing, and is constructed as follows:

I are the side timbers to which the transverse bars K are secured.

L are the stationary jaws of the clamps which are likewise secured to the side rails I and are curved upon one surface to correspond with the concavity of the interior of the stave to be dressed.

M are the followers or movable jaws of the clamps. They are permitted to slide freely upon the rails I, and are forced up to their work by the screws *f* which work in the cross bars K of the carriage. They are made concave to correspond with the exterior surface of the stave, and together with the stationary jaws L are so inclined to the general level of the carriage as seen in Fig. 7, that each stave when dressed in a horizontal plane, shall be jointed in a plane passing through the axis of the cask.

*g* is a longitudinal bar running the whole length of the carriage and passing through mortises *i* in the ends of the bars K. These mortises are larger than the width of the bar *g* which is secured firmly in position by the wedge keys *h*. These keys may be withdrawn from the position which they occupy at *h* in Figs. 5 and 6 and the bar *g* may then be thrown farther out toward the ends of the cross bars K as seen in *g'*, Fig. 5, in which position it may be secured by driving the keys upon the other side of it as at *h'* Fig. 5.

N is a circular saw running in suitable bearings in the framework of the planing machine and in such position that as the carriage advances for the purpose of jointing the staves, the latter are at the same time reduced to the proper length.

The operation of this machine is as follows: The staves as they come from the shaping machine are secured in the clamps by the pressure of the screws *f* upon the jaws M, the bar *g* being in the position represented at *g'*, Fig. 5; the carriage is then run through the machine, the revolving cutters *l* jointing the edges of the staves in a horizontal plane at the same time that the staves are reduced to an uniform length by the saws N. The clamps are then loosened and the bar *g* returned to the position seen at *g* in Fig. 5, by which means the staves are projected slightly beyond the position which they formerly occupied. They are then turned over, the other side being placed uppermost, when the carriage is again run through the machine the opposite edges of the staves are jointed, and the staves are trimmed upon the other end by the circular saw an amount equal to the motion of the bar *g*. It is evident that the staves will leave this machine of an uniform length and width and accurately jointed in planes passing through the axis of the cask.

The staves are now completed and the next operation is to set up the casks; this is accomplished in the machine represented in Figs. 11 and 12.

G' is the platform of the machine. H' H'' uprights which carrying the spindles I' I'', the former of which is stationary, while the latter may be brought more or less near to the other by means of the screws and crank K'. The heads L' L'' are then applied to the spindles, the guide pins *f'* entering the center of the head. The staves are then placed upon the heads in succession, the barrel being revolved as the work proceeds, the guides M' M'' preventing the staves from falling until the truss hoops are forced on. These hoops are of metal that they may be made so thin as not to interfere with the subsequent operation of hooping, which is performed upon the machine represented in Fig. 13. The barrel as it comes from the last described machine is secured in the hooping machine by the clamp N', the retaining bar being held, until released, by the button P'.

Q' is a frustum of a cone of metal, hard wood or other suitable material, the base of which is the exact size of the barrel. This cone is placed upon the cask R' as seen at Fig. 13 and is temporarily secured thereto by a screw *s'* or by other efficient means, and serves to guide the hoops in the manner which will be hereafter explained.

S' is a metallic head to which are hinged

the drivers  $g''$  which are guided by slots in the disk  $T'$  and are forced into their work by springs  $h''$ .

$T''$  is a vertical shaft attached to the head  $S'$  and disk  $T'$  which passes up through the framework in which it slides freely, its motions being governed by the cord  $V'$  attached to its upper end, or in any other suitable and appropriate manner. The hoops being arranged at hand of as many different sizes as may be required, the barrel is placed in the clamp and surmounted by the cone  $Q'$ . The hooks are then placed upon the cone one by one and the drivers are permitted to descend and force the hoop to its place. It is evident that these drivers may be worked by a lever or by a treadle and be carried up by a spring or weighted cord, or it may be weighted and permitted to drop for the purpose of driving the hoop to its place.

What I claim as my invention and desire to secure by Letters Patent is—

1. Forming or shaping the staves previous to jointing them by passing them through a series of pairs of curved rollers in the manner set forth and for the purpose described.

2. The peculiar construction of the carriage of the jointing machine represented in Fig. 5, the bar  $g$  being made adjustable within the long slots or mortises in the manner set forth and for the purpose described.

3. I claim the combination of the cone  $Q'$  with the spring drivers  $g''$  operating as described for the purpose of guiding the hoop to the barrel and driving it into place in the manner set forth.

In testimony whereof I have hereunto set my signature this eighth day of August, A. D. 1853.

GEO. W. LIVERMORE.

In presence of—

CAUSTEN BROWNE,  
SAM. COOPIN.