

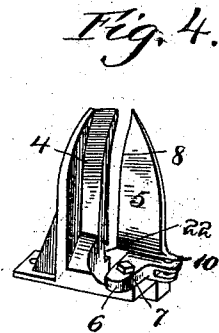
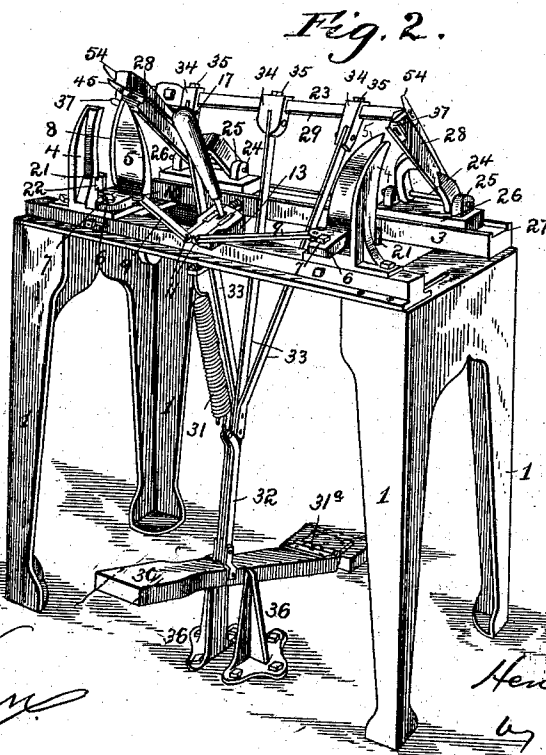
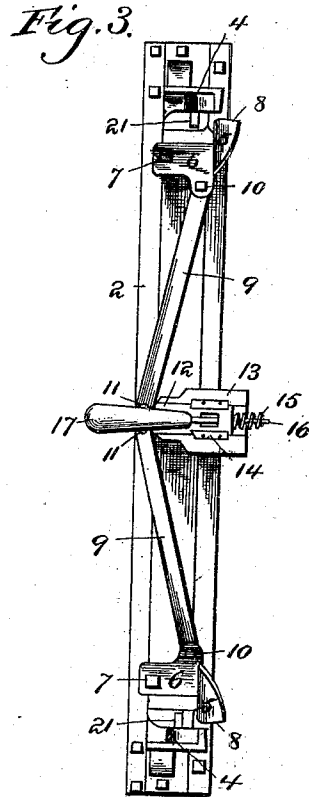
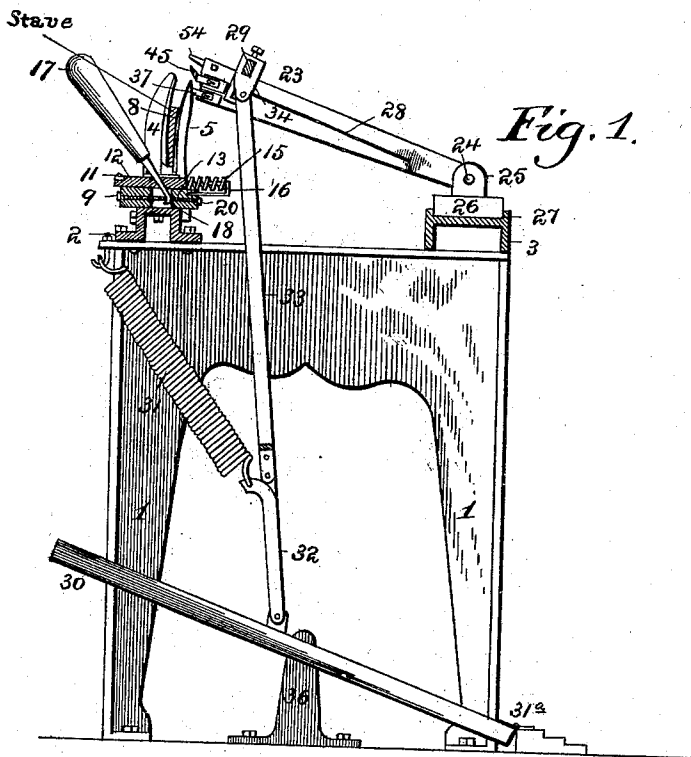
(No Model.)

2 Sheets—Sheet 1.

H. CAMPBELL.
CROZING MACHINE.

No. 505,591.

Patented Sept. 26, 1893.



Witnesses:
J. B. McGirr.
J. Benjamin.

Inventor:
Henry Campbell,
by H. M. Low
attorney.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 5.

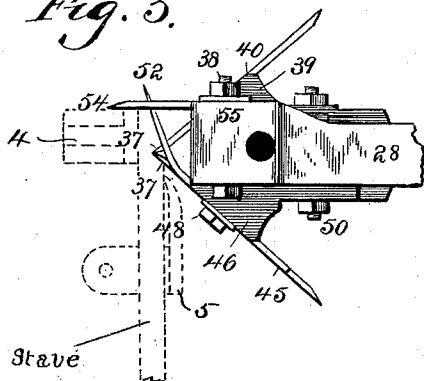


Fig. 6.

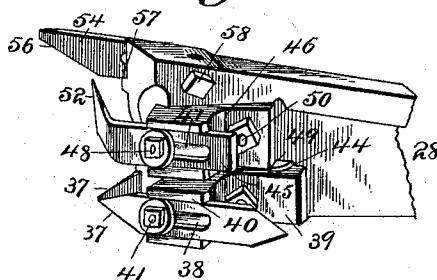


Fig. 7.

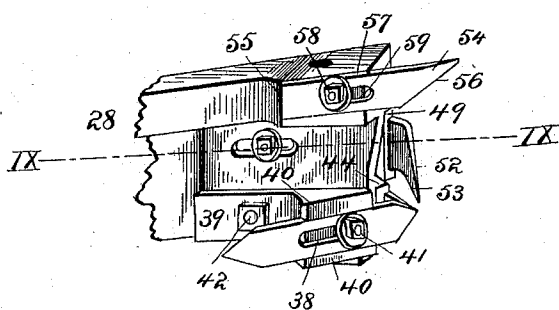


Fig. 8.

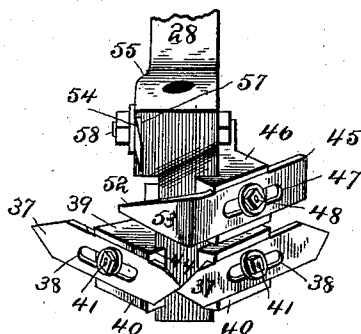
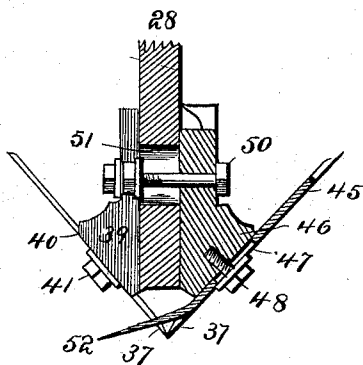


Fig. 9.



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UNITED STATES PATENT OFFICE.

HENRY CAMPBELL, OF BALTIMORE, MARYLAND.

CROZING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 505,591, dated September 26, 1893.

Application filed July 7, 1892. Serial No. 439,258. (No model.) Patented in England July 16, 1892, No. 13,104.

To all whom it may concern:

Be it known that I, HENRY CAMPBELL, a citizen of the United States, residing at Baltimore city, in the State of Maryland, have invented certain new and useful Improvements in Crozing-Machines, patented in Great Britain July 16, 1892, No. 13,104; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to that class of crozing machines in which the crozing knives, and the chamfering and trimming knives if the latter are caused to perform their operation at the same time, move around a center upon a radius of any suitable length corresponding more or less nearly with the radius of the vessel of which the staves are to form a part. In such a machine it is very essential that the staves shall be clamped with great force both to bring the curve of the stave into exact coincidence with the path of the crozing cutters and to prevent any possibility of movement of the stave while its ends are being operated upon by the knives.

My invention consists in improvements in the mode of construction and in the means for actuating the stave clamping devices, in the means for mounting and adjusting the knives and in the means for throwing out of the machine the finished stave.

My invention further consists in the parts and combinations thereof hereinafter more particularly described and claimed.

In order to make my improvements clearly understood I have shown in the accompanying drawings means for carrying them into practical effect, without limiting the invention to the particular construction which, for the sake of illustration, I have delineated.

In said drawings—Figure 1 is a vertical sectional view of a crozing machine embodying my invention. Fig. 2 is a perspective view of the same. Fig. 3 is a plan view of the clamps and their actuating mechanism. Fig. 4 is a perspective view of one of the clamps. Fig. 5 is a plan view of one of the cutter heads with its knives. Fig. 6 is a perspective view of the same from the inner side. Fig. 7 is a perspective view from the outer side. Fig. 8 is a perspective view from the front side.

Fig. 9 is a horizontal sectional view on line IX—IX, Fig. 7.

Referring to the drawings—1 indicates the supports or legs of a suitable frame, connected at the top by a front rail 2 and rear rail 3 bolted to the legs.

4, 4, indicate brackets mounted rigidly on the frame, preferably on the front rail 2, against the inner faces of which brackets the stave to be operated on is firmly held by clamps 5, 5. The latter have horizontal arms or feet 6 pivotally mounted on the frame or on the brackets 4, the latter construction being illustrated, by bolts 7. The vertical or upwardly extending parts of the clamps have biting edges or portions 8 which conform in contour to the inner faces of the brackets. The best contour is an arc corresponding more or less with the barrel or vessel to be produced—that is to say, an arc formed on or approximately on, the same radius as the barrel or vessel. It will be observed that this form of clamp can obtain a very powerful hold upon the stave, so that the stave is not only firmly grasped but can be temporarily bent to the proper contour, namely the contour which it will assume in the finished vessel. And this can be done by comparatively small expenditure of power by the operator. This results from the fact that the stave clamps are so mounted, oscillating in planes substantially parallel with the length of the stave, that the movement of the biting edge or part of the clamp toward the stave is much less than the movement parallel with the stave, and from the further fact that the power is applied to the clamp in substantially the latter direction. The movable parts 5 of the clamps are mounted at the concave side of the stave and between the fixed parts, and move outward and toward the stave to clamp it. They are thus, while adapted to engage the stave almost at the points where it is cut, out of the way and their operating mechanism is out of the way of the crozing knives, the latter being mounted and operating in paths outside the movable parts. I prefer to actuate the clamps by toggle links 9, 9 pivoted to the clamps at 10 and pivoted at 11 to a sliding block 12. The block fits in a guide 13 and is held down therein by edge-plates 14, and is normally pressed and held in a direc-

tion to retract the clamps by a spring 15. The spring is held on an arm 16 carried by the guide, and bears against the inner side of the block. The guide is rigidly secured to the front rail 2, or other appropriate part of the frame. The block is moved inward to spread the toggle by a hand lever 17 passing through and engaging the side of an aperture in the block and having a fulcrum at 18 between two adjustable bolts or screws 19, 20, seated in the guide. The lower end of the lever is rounded so as to work easily between the contiguous ends of the screws and is held thereby from disengagement. It will be observed that by thrusting the hand lever inward the stave will be clamped. The lower edge of the stave rests on wooden blocks 21 held in dovetailed grooves 22 formed in the brackets. These blocks engage the stave on the under side at the places where the crozing and other knives emerge after having completed their cuts, and prevent any splintering of the stave as the knives cut their way out.

I will now describe the means by which the stave is crozed and otherwise shaped.

23 is a vertically movable frame, which is most conveniently mounted, so as to be retained in proper relation to the stave holding devices and yet have a free up and down movement, by means of pivot or hinge pins 24. These pins are supported in the ears 25 of stands 26, the latter being held in the longitudinal groove 27 of the rear rail 3, in which one or both of the stands is longitudinally adjustable so as to enable the machine to be adapted to staves of different lengths. The pins 24 pass through the rear ends of arms 28 which are a part of the frame 23. Said arms are united at their front ends by a longitudinal bar 29, which is adjustably clamped to one or both of the arms so as to permit of a slight longitudinal extension of the machine as already mentioned, the adjustment corresponding with that of one or both of the stands 26. One or both of the brackets and clamps 4, 5, is correspondingly adjustable on the rail 2.

The frame 23 is actuated by any suitable power device. I prefer a treadle 30 and spring 31, the former for depressing the frame to make the croze, chamfer, &c., and the latter for lifting and restoring the frame to its initial position. The treadle is pivoted at 31^a to the floor or other base, extends to the front of the machine within reach of the operator's foot, and is connected with the frame 23. This connection may be formed of a rod or rods 32, branched as indicated at 33, and hinged in blocks 34 which are longitudinally adjustable and securable on the bar 29 by set screws 35. The spring 31 is connected with the frame and with the treadle, or with the rod or rods 32. In order that the operator by sidewise pressure on the treadle may not displace or tend to displace or spring out of line the frame 23 I provide the treadle with guides 36 which permit it to move only in

vertical planes and impart only a direct downward pull to the frame.

Referring especially to Figs. 5 to 9, 37, 37 indicate the crozing knives. They are provided with longitudinal slots 38 and are seated in the inclined faces of guide blocks 39 between edge flanges 40. They are secured to the blocks by clamp screws 41 which pass through said slots and engage screw-threaded apertures in the blocks. The blocks 39 are situated one on each side of the arm 28 and secured by a bolt 42 which passes through the blocks and an aperture or slot 43 in the arm. It will be seen that by this mode of securing the crozing knives they may be adjusted individually diagonally toward or from each other on the blocks 39 to bring their points into proper mutual relation, or adjusted together by moving the blocks toward or from the end of the arm, to bring the knives to the right distance from the stave-holding devices to make the proper depth of croze. The blocks are directed in this adjustment by channels 44 formed in the arm, in which channels the blocks fit.

The chamfering knife is shown at 45 and is mounted just above the crozing knives on a block 46, to which it is adjustably secured by slot 47 and screw 48, as already described in the case of the crozing knives. The block 46 is seated in a channel 49 and clamped, when adjusted, by a bolt 50 passing through a slot 51 in the arm. The chamfering knife has an inclined foot 52 provided with a cutting edge 53, adapted to chamfer the end of the stave from a point at or near the croze to the end.

54 is the trimming knife mounted upon an off-set or projection 55 of the arm so that it will cut off the end of the stave at the proper distance from the croze. This knife has a downwardly directed edge 56 transverse to the stave, is seated in a channel 57 on the arm and is adjustably secured by a bolt or screw 58 passing through a slot 59 in the knife and engaging the arm. As the frame and knives descend the trimming knife 54 passes down against and along the outer face of the bracket 4, which contact of the two trimming knives with the brackets necessitates an accurate movement of all of the knives and perfect shaping of the staves, and also prevent any splintering off upon the outside of the stave at its ends under the action of the trimming knives, the material of the stave being supported by the brackets 4 along the lines on which the trimming knives operate. The operative portions of the edges of the knives 54 do not come in contact with the brackets.

The ejection of the finished stave is effected by the upward movement of the crozing knives, or any equivalent projection carried by the frame 23, the stave being permitted after the descent of said frame and action of the knives to spring or yield back slightly upon being released by the clamps, or be pushed back by hand, so that the inner corner or face of the stave will be sufficiently

over the knives or over said equivalent projection, to be engaged by said knives or by said projection or projections and lifted clear of the clamps as the knife frame rises and be
 5 thrown or permitted to slide over the back of the machine.

To recapitulate briefly the operation of the machine: the stave is first dropped into the open clamp. If the stave be of originally
 10 curved shape the curved and concave surface will be placed inward toward the knives. The lever 17 is then forced inward to cause the clamps to firmly bite the stave, curving it at the ends to correspond with the arc of
 15 the knives if the stave be originally flat or of a different curve from the contour of the clamps, unless the staves be of too thick and rigid material. The operator then depresses the treadle bringing down the knife
 20 frame and causing the several knives to make their appropriate cuts, thereby crozing, chamfering and trimming both ends of the stave. The clamps are then released and the treadle and knife frame permitted to rise under the
 25 action of the spring 31, ejecting the finished stave and leaving the machine with its parts in position for the reception of and operation upon another stave.

It will be understood that this machine
 30 may be built to operate upon but one end of the stave, when firkins, truck barrels or tubs are manufactured, or the knives upon one end of the machine may, for such use, be set back out of operative position.

35 What I claim is—

1. In a crozing machine the combination of clamps for the stave having fixed parts 4, and movable parts 5 the latter mounted at the
 40 concave side of the stave and between the fixed parts, means for forcing said movable parts outward and toward the stave to clamp it, crozing knives mounted and oscillating in paths outside of said fixed parts, and means for oscillating the knives, substantially as
 45 set forth.

2. In a crozing machine the combination with means for clamping the staves comprising brackets 4, 4, at the convex side of the
 50 stave and concave and concentric with the arc of the knives an oscillating frame carrying crozing knives, and trimming knives also carried by said frame and adapted to engage the outer sides of the brackets, substantially
 55 as set forth.

3. The combination with a main frame, of brackets 4, 4, and clamps 5, 5, one of said
 60 brackets and clamps being longitudinally adjustable on the frame, stands 26 on said frame one of which stands is longitudinally adjustable, thereon an oscillating frame 23 comprising arms 28 pivoted on said stands and a bar 29 connecting said arms and adjustably
 65 secured to one of said arms, crozing knives carried by said arms, and mechanism for actuating said frame, substantially as set forth.

4. In a crozing machine the combination with means for clamping the stave, comprising brackets 4, 4 an oscillating frame carrying the crozing knives trimming knives carried by said frame and adapted to engage the
 70 sides of said brackets, of a treadle connected with said frame, and guides 36 by which lateral pull on the crozing knives is prevented and the latter kept in line with the sides of said brackets, said guides engaging the
 75 treadle, substantially as set forth.

5. The combination with an arm 28 of blocks 39 having inclined faces, carrying the crozing knives, and adjustable on said arm, a block 46 adjustable on the arm and having
 80 an inclined face, a chamfering knife having an inclined foot 52 and mounted and adjustable on said arm, and a trimming knife mounted on the arm, substantially as set forth.
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6. In a crozing machine the combination of a movable frame, crozing knives thereon, clamps for the stave which are open in the direction in which said frame moves on its return after the crozing operation, and means
 90 for operating said clamps to clamp or release the stave, whereby said frame is enabled to eject the stave on its return movement, substantially as set forth.

7. In a crozing machine the combination 95 with the main frame, of upright brackets 4, 4 thereon having concave inner faces, upright clamps 5 having convex edges and feet 6, vertical pivots 7 for the latter, links 9 connected with the clamps for oscillating them on
 100 said pivots, means for forcing said links inward and outward, an oscillating frame 23 carrying crozing knives, and means for moving the latter frame upward and downward, substantially as set forth.
 105

8. In a crozing machine the combination with the guide blocks 39 having faces inclined toward each other, of crozing knives mounted and longitudinally adjustable on said faces and having their cutting extremities in
 110 contiguity with each other, an oscillating arm 28 between said blocks and on which they are longitudinally adjustable, and means for securing the blocks on the arm, as set forth.

9. In a crozing machine the combination 115 with the clamps having the fixed parts 4 and oscillating parts 5 provided with ears 6, of the toggle links 9 pivoted to said ears and extending toward each other, the sliding block 12 to which said links are connected, the hand
 120 lever 17 engaging the block, and an adjustable fulcrum for the lever, as set forth.

In testimony whereof I affix my signature in the presence of two witnesses.

HENRY CAMPBELL.

Witnesses:

A. W. CHAPMAN,
 L. C. W. PAGE.