

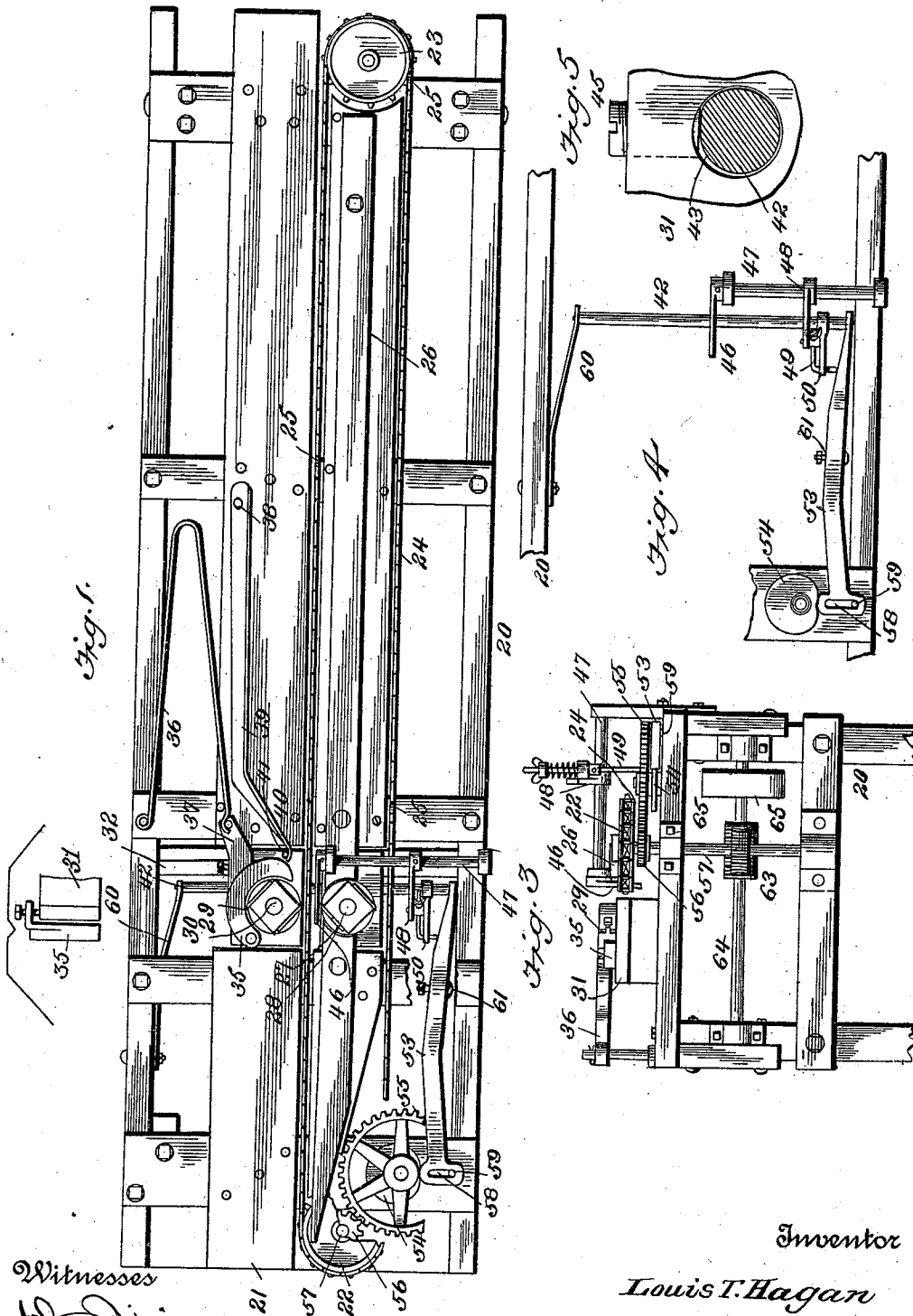
(No Model.)

2 Sheets—Sheet 1.

L. T. HAGAN.
STAVE JOINTING MACHINE.

No. 530,943.

Patented Dec. 18, 1894.

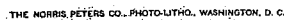


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2 Sheets—Sheet 2.

Patented Dec. 18, 1894.



UNITED STATES PATENT OFFICE.

LOUIS T. HAGAN, OF WINCHESTER, KENTUCKY, ASSIGNOR TO THE CONN-
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STAVE-JOINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 530,943, dated December 18, 1894.

Application filed February 17, 1894. Serial No. 500,571. (No model.)

To all whom it may concern:

Be it known that I, LOUIS T. HAGAN, a citizen of the United States, residing at Winchester, in the county of Clark and State of Kentucky, have invented new and useful Improvements in Stave-Jointing Machines, of which the following is a specification.

This invention relates to a class of stave jointing machines in which two cutter heads are so arranged as to joint both edges of barrel, keg and hogshead staves at one operation.

It is the object of my invention to provide an improved self-adjusting machine of simple construction, capable of making a stave of equal width at both ends and of any width in the middle to give the required bilge, and which shall be adapted to joint staves of random widths, without any attention from the operator more than to lay the stave blank onto the machine table.

My improved stave jointing machine comprises two rotary cutter heads, one of which is mounted in stationary bearings and the other in a movable housing or bracket. It also comprises improved mechanism for automatically adjusting the movable cutter head to any width of stave; mechanism for automatically locking the said movable cutter head in its adjusted position with relation to the required bilge until the stave has passed from between the two cutter heads, the distance between the said cutter heads being gradually and automatically increased as the middle of the stave is approached and in like manner diminished toward its ends, thus giving the stave the required bilge; and improved devices for feeding and guiding the stave to and between the cutters.

The machine is designed principally for jointing staves for tobacco hogsheads, but will operate equally well on staves for any kind of hogshead, keg or barrel and on staves for either tight or slack coopering. The cutter blades should have working edges of such slant or inclination as will give the desired bevel to the edge of the stave. Where the stave blanks are made out of thick lumber that has been resawed, thus providing two staves of exactly the same width, they may be both jointed at the same time by plac-

ing one on top of the other and using a cutter having a double slant that will bevel the two superposed staves in opposite directions.

My invention consists in the features of construction and novel combinations of devices in a stave jointing machine as hereinafter more particularly described and claimed.

In the annexed drawings illustrating the invention—Figure 1 is a plan of my improved stave jointing machine. Fig. 2 is a sectional side elevation of the same. Fig. 3 is an elevation of one end of the machine. Fig. 4 is a detail plan of the mechanism for automatically locking the adjustable movable cutter head and for regulating the bilge of the stave. Fig. 5 is an enlarged detail view of a portion of the movable cutter head support, with the locking cam shaft in section. Figs. 6 and 7 are detail elevations of the locking mechanism from the opposite side of the position in which it is shown in Fig. 2. Figs. 8 and 9 illustrate an arrangement for automatically actuating the locking mechanism of the movable cutter head from an arm or finger working under the stave instead of on its top. Fig. 10 is a view illustrating the jointing of both edges of two staves at one time. Fig. 11 illustrates a movable cutter head mounted in a swinging frame or bracket.

Referring to the drawings, the numeral 20 designates the machine frame, which is oblong and of any suitable construction. This frame supports a flat table or bed 21 that is preferably made in several pieces suitably spaced apart to accommodate the various operative parts of the machine.

In a horizontal position at opposite ends of the machine are two sprocket wheels 22 and 23 for supporting and actuating an endless sprocket chain 24 by which the stave blank is fed or moved along. This feed mechanism is so arranged that the upper edge of the chain will be about flush with the top of the table or bed 21 on which the stave is to be placed. The upper edge of the feed chain 24 is provided at suitable intervals with upwardly projecting lugs 25 that are extended somewhat above the level of the table. The distance between these lugs 25 may be about one foot greater than the length of the stave to be jointed.

To one side of the table 21, and within the space inclosed by the feed chain 24, is secured a guide bar 26 that projects above the table and is extended nearly or quite the entire length of the machine. The stave to be jointed is laid on the machine table with one edge against the guide 26 and with its rear end immediately in front of and in contact with one of the upwardly projecting lugs 25 on the feed chain 24 by which the stave is thus carried forward in or upon the machine without requiring any further attention or manipulation until it is discharged in a finished state at the farther end of the machine.

At a suitable point the machine table 21 and guide-bar 26 are sectioned or divided to accommodate the stationary cutter head 27 that is arranged just above the space inclosed by the endless feed chain. This cutter-head 27 is carried by a vertical shaft 28 mounted in stationary bearings below the top of the machine and provided with a suitable driving pulley. The movable cutter head 29 is arranged parallel with the stationary cutter head 27, and is revolved through a suitable pulley on its vertical shaft 30 which is mounted in a movable bracket or housing 31 that may be arranged to slide on bars or ways 32 and 33 supported transversely below the machine table. The housing or bracket 31 is preferably provided with rollers 34 to reduce friction.

The bracket or support 31 of the movable cutter head 29 carries at its upper end a chip breaker 35 that is so adjusted as to allow the cutter head to take off the proper quantity of material to give the desired bilge to the stave. The stationary cutter head is similarly arranged with relation to the guide-bar 26; and in order that the stave may have the same bilge on both edges, the divided guide-bar 26 is not put on straight from end to end, but the outer ends, away from the cutter head, are set over to one side so as to make the guide concave in its length on that side along which the stave passes. It will thus be seen that provision is made for having the bilge equal on both edges of the stave.

For the purpose of normally pressing the movable cutter head 29 toward the stationary cutter head 27 a spring 36 is attached to the machine frame and connected with, or arranged to exert pressure on, an arm or projection 37 of the movable cutter head support. To the table 21 is pivoted, at 38, one end of a horizontally arranged lever 39, the other end of which is extended toward the movable cutter head. At the end nearest the movable cutter head the lever 39 is provided with a laterally and forwardly inclined extension 40 that projects in the path of the stave as it approaches the cutters. The end of the inclined lever extension 40 bears against one side of a lug or projection 41, on the movable bracket support or housing 31 of the movable cutter head, in such direction that as the

stave moves forward and strikes the incline 40 the lever 39 will be caused to move the cutter-head 29 outward, against the pressure of the spring 36, until the stave enters between the movable cutter head and chip breaker 35 on one side and the stationary cutter head and guide 26 on the other.

Through the upper portion of the housing or bracket support 31 of the movable cutter head 29 is passed a transversely arranged shaft 42 along which the said housing or bracket support is adapted to freely slide except when locked to said shaft. Where the shaft 42 passes through the housing or bracket 31 it is provided with an eccentric or cam surface 43 that is adapted to have a locking engagement with a suitably shaped aperture or recess 44 that may be controlled or regulated by a set screw 45, Fig. 5, inserted in said bracket or housing, the locking together of said shaft and housing being effected by imparting a partial rotation to the said shaft. When the passing stave has moved the cutter-head 29 outward along the shaft 42 so that the stave will enter between the two cutter heads the movable cutter head 29 will be locked in that position by an automatically effected movement of the shaft 42, actuated from the stave. This may be accomplished in several ways. In the construction shown in Figs. 1, 2, 3, 4, 6, and 7, a depending forwardly curved finger 46 is secured to the inner end of a rock-shaft 47 supported transversely above the guide 26 and at the approach side of the stationary cutter head. This depending finger 46 is in the path of the advancing stave and is adapted to be lifted by it and thus rock the shaft 47 when the stave has entered between the cutter heads and has shifted the movable cutter-head 29 outward to its adjusted position as already described. On the shaft 47 is an arm 48 connected by a rod 49 with an arm 50 on the locking cam shaft 42; and on the rod 49, above the arm 48, is a spiral spring 51, the tension of which may be adjusted by a thumb nut 52 on the upper end of said rod. When the stave lifts the depending finger 46 and rocks the shaft 47 it causes the arm 48, rod 49, and arm 50 to turn the locking cam shaft 42 a part of a revolution until it is firmly engaged in the locking aperture of the bracket or housing that carries the movable cutter head.

During the forward movement of the stave, the movable cutter-head 29, after being locked with the shaft 42, receives therewith a slight lateral motion through mechanism arranged to control the required bilge of the stave. In one side of the machine frame is fulcrumed a lever 53, one end of which is connected with, or arranged to bear against, one end of the shaft 42 in such direction as to impart an endwise movement thereto and thence to the cutter-head 29 for controlling the bilge. The other end of the lever 53 bears against and is actuated from a cam 54 on a short verti-

cal shaft driven by a gear 55 from a pinion 56 on a vertical shaft 57 through which is also driven the sprocket-wheel 22 of the stave feeding mechanism. In the end of the lever 53, adjacent to the cam 54, is a slot 58 working on a pin 59 that guides the said lever and holds it in position. A strong spring 60 is arranged to bear against the extreme end of the shaft 42 opposite the end on which the lever 53 acts. The spring 60 presses on the shaft 42 in such manner as to hold it firmly against the lever 53, and at the same time holds the lever 53 against the cam 54 and causes it to follow the movement of the cam, without any lost motion. The lever 53 pivots on a movable fulcrum or bolt head 61 passed through an elongated slot 62 in said lever and supported at any suitable point on the machine frame. By moving this bolt head 61 nearer to or farther from the cam 54 the leverage can be adjusted to give the staves more or less bilge as required. The cam 54 is so geared with the shaft of the sprocket wheel 22 that it will make one revolution in the length of each stave. Through the action of this cam 54 on the lever 53 the locked together shaft 42 and movable cutter head 29 will receive the necessary lateral motion to give the stave the required bilge. If it is desired to arrange the machine at different times for jointing longer or shorter staves, it is necessary to change the feed chain 24, or the lugs 25 thereon, so that the lugs will be the proper distance apart for the length of the staves and, also, change the gearing of the cam 54 so that it will make one revolution to each stave passed through the machine.

The feed chain 24 is driven by the sprocket-wheel 22 on the vertical shaft 57 which is connected by worm gears 63, or other suitable gearing, with a transversely arranged shaft 64 provided with a pulley 65 driven by belting from a pulley 66 on a countershaft 67 at any convenient point. Other pulleys 68 on this countershaft 67 are belted to pulleys 69 on the shafts of the revolving cutter heads.

While the stave is passing between the revolving cutter heads 27 and 29, the raised position of the finger 46, held up by the stave, causes the supporting bracket of the movable cutter head to remain in its locked position on the shaft 42, so that through the lateral movements imparted by the cam 54 and lever 53 the required bilge will be obtained. When the stave has passed the cutter heads the finger 46 will drop, or be forced down by the spring 51 on the rod 49, thus rocking the shafts 47 and 42 backward and unlocking the movable cutter head 29 so as to allow it to be moved, by the spring 36, toward the stationary cutter head in readiness for another stave. The spring 51 allows staves of varying thickness to pass under the finger 46, and causes the finger to press down on the

upper surface of the stave in readiness to drop as soon as the stave has passed by the cutter heads. Figs. 2 and 6 show the locking mechanism in the position it occupies before the stave raises the finger 46 and Fig. 7 shows its position after the stave has passed from beneath the said finger.

The lugs 25 on the chain 24 that feeds the staves through the machine should be sufficiently far apart, or at distances enough greater than the length of the staves to be jointed, that the finger 46 will drop and unlock the housing of the movable cutter head before the next stave starts in.

In Figs. 8 and 9 is shown an arrangement for automatically actuating the locking shaft 42 by means of an arm or finger 70 working under the stave instead of on top. This finger 70 is fastened to the shaft 42, and projects above the table in such position that it will be struck by the advancing stave and pressed down, thus turning the shaft 42 until it is locked with the housing or bracket support 31 of the movable cutter head, the stave in this case being held down by springs 71 to prevent it from rising over the shaft actuating finger.

For the purpose of adapting the machine to joint two staves of equal width, at one operation, I may provide each cutter blade 72 with a double slant, as shown in Fig. 10, and place one stave 73 on top of the other so that in passing between the cutter heads they will be beveled in opposite directions. This arrangement is especially convenient in jointing staves that have been cut from thick lumber and resawed, thus making two staves of exactly the same width.

Instead of having the movable cutter head 29 mounted in a housing or bracket arranged to slide on the transverse bars 32, 33, Fig. 2, it may be mounted in a swinging frame or bracket 74, Fig. 11, pivoted to cross bars 75 supported by the machine frame.

It will be seen that the machine is adapted to adjust itself for jointing staves of random widths, without requiring any attention from the operator, and that with a slight change in the feed chain and in gearing the mechanism for controlling the bilge it will work equally well on staves of any length, whether for kegs, barrels, or hogsheads.

What I claim as my invention is—

1. In a stave jointing machine, the combination of two cutter heads one of which is movable toward and from the other, a spring to press the movable cutter head toward the stationary cutter head, a rock-shaft extended transversely through the housing or support of the movable cutter head and adapted to have a locking engagement therewith, a lever projecting in the path of an advancing stave and arranged to exert a pressure on the movable cutter head support to force it along said rock-shaft and laterally away from the stationary cutter head and mechanism act-

uated from the advancing stave to impart a partial rotation to the rock-shaft and cause it to become locked with the support of the movable cutter head, substantially as described.

2. In a stave jointer, the combination of two cutter heads one of which is automatically adjustable toward and from the other, an endless feed chain provided with upwardly projecting lugs arranged at intervals greater than the length of a stave, a locking rock-shaft extended through the housing or support of the movable cutter head and adapted to be locked therewith, means for actuating said rock-shaft from an advancing stave to lock the said shaft with the movable cutter head support, and mechanism for automatically imparting endwise movement to the rock-shaft to control the bilge of the stave, substantially as described.

3. In a stave jointing machine, the combination with the stationary cutter-head and the movable cutter-head, of a transversely arranged rock-shaft extended through the housing or support of the movable cutter head and adapted to have a locking engagement therewith, a lever projecting in the path of an advancing stave to force the movable cutter head along said rock-shaft and away from the stationary cutter-head, a finger arranged to be acted on by the stave to impart a partial rotation to the said rock-shaft and cause it to become locked in the housing or support of the movable cutter head, and mechanism for imparting endwise movement to the said rock-shaft for controlling the bilge of the stave, substantially as described.

4. In a stave jointing machine, the combination with the stationary cutter head, the movable cutter head, and a transversely arranged rock-shaft extended through the housing or support of the movable cutter head and adapted to have a locking engagement therewith, said locking rock-shaft provided with an arm, of a rock-shaft mounted transversely above the machine table and provided with an arm and with a finger depending in the path of an advancing stave, a rod connecting the arms of the two rock-shafts, a spring on said rod, and mechanism for imparting endwise movement to said rock-shaft for controlling the bilge of the stave, substantially as described.

5. In a stave jointing machine, the combination of two cutter heads one of which is movable toward and from the other, a lever arranged to be acted on by an advancing stave

to press the movable cutter head away from the stationary cutter head, a locking rock-shaft extended through the housing or movable support of the movable cutter head, and adapted to be locked therewith, a finger arranged to be actuated by the stave to turn the rock-shaft into locking engagement with the housing or support of the movable cutter head, a lever provided with an adjustable fulcrum and having one end in engagement with one end of the said locking rock-shaft to move it endwise for controlling the bilge of the stave, a cam acting on the other end of said lever, and a spring pressing against the other end of the rock-shaft, substantially as described.

6. In a stave jointing machine, the combination of an endless feed chain supported and driven by sprocket gears and provided with upwardly projecting lugs arranged at intervals greater than the length of a stave, two cutter heads one of which is movable toward and from the other, a locking rock-shaft extended through the housing or support of the movable cutter head and adapted to be locked therewith, a finger adapted to be actuated by the stave to turn the said rock-shaft into locking engagement with the housing or support of the movable cutter head, a lever for imparting endwise movement to said rock-shaft for controlling the bilge of the stave, and a cam geared with the driving mechanism of the feed chain and adapted to actuate said lever, substantially as described.

7. In a stave jointing machine, the combination of two cutter heads one of which is movable toward and from the other and each provided with cutters having a double slant to bevel both edges of two superposed staves at one operation, a lever acted on by the staves to press the movable cutter-head away from the stationary cutter head, a locking rock-shaft extended through the support of the movable cutter head and adapted to be locked therewith, a finger adapted to be actuated by the stave for turning said rock-shaft into position for locking the movable cutter-head, and mechanism for imparting endwise movement to said rock-shaft to control the bilge of the stave, substantially as described.

In testimony whereof I have hereunto set my hand and affixed my seal in presence of two subscribing witnesses.

LOUIS T. HAGAN. [L. S.]

Witnesses:

FRED BROADHURST,
W. T. FOX.