2 Sheets--Sheet 1.

# E. & B. HOLMES.

## Machine for Sawing Barrel-Heads.

No. 166,873. Patented Aug. 17, 1875.

*Fig. 1.*

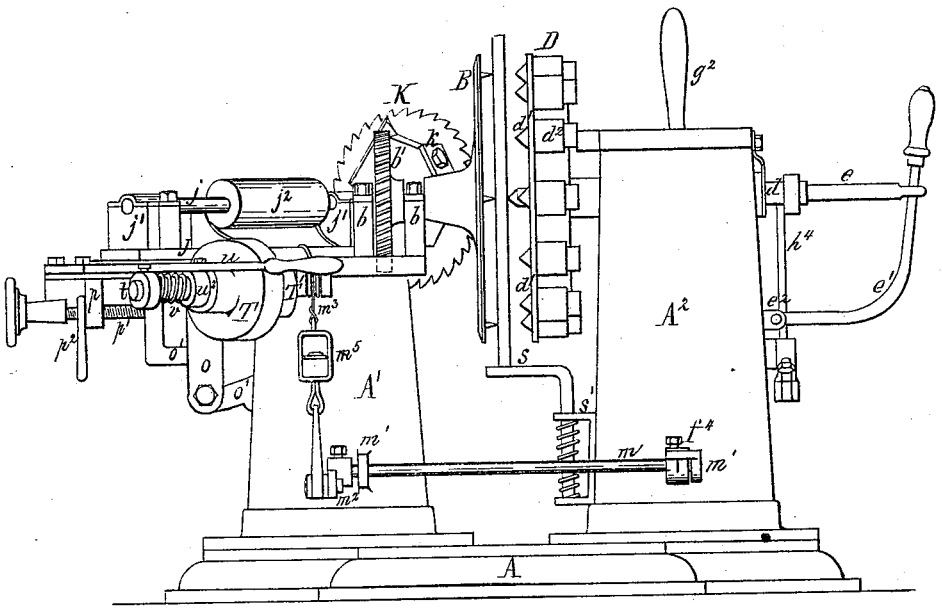
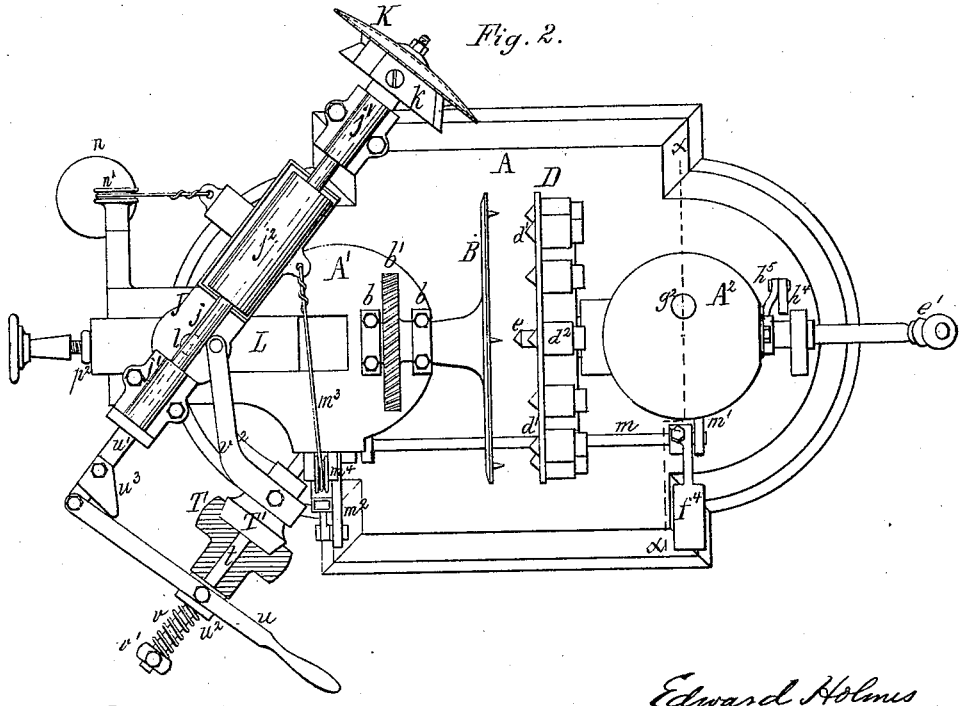



*Fig. 2.*

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2 Sheets--Sheet 2.

# E. & B. HOLMES.

## Machine for Sawing Barrel-Heads.

No. 166,873. Patented Aug. 17, 1875.

Fig. 3.

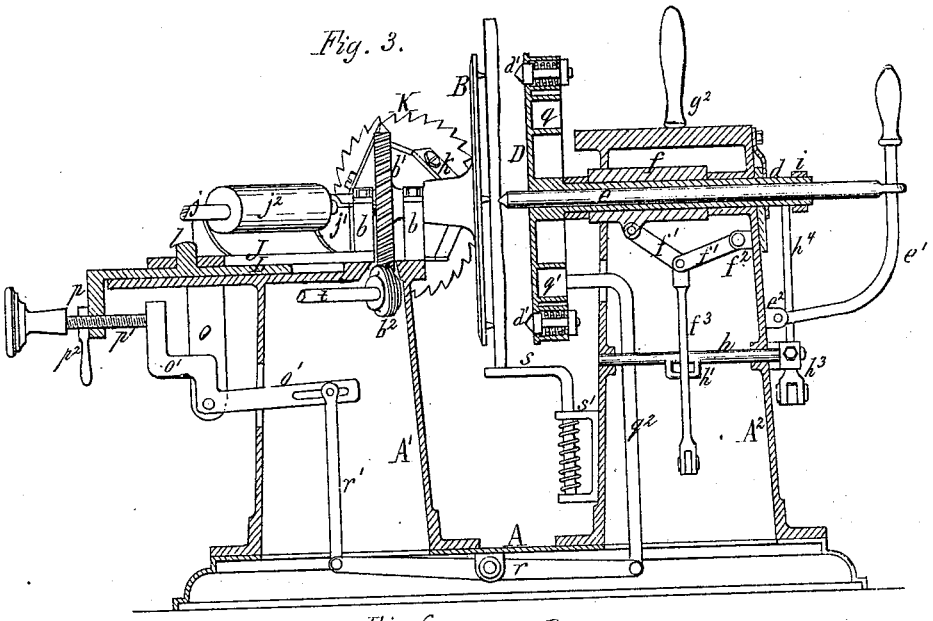



Fig. 6.

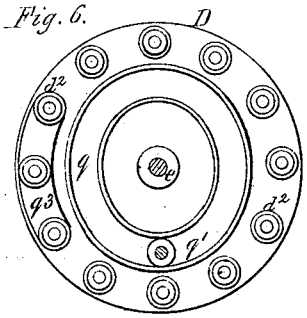



Fig. 4.

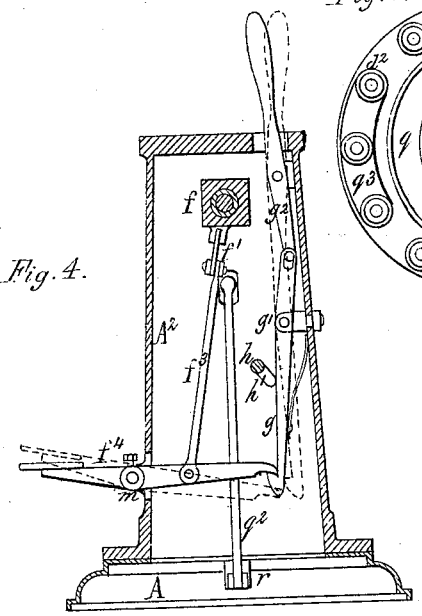
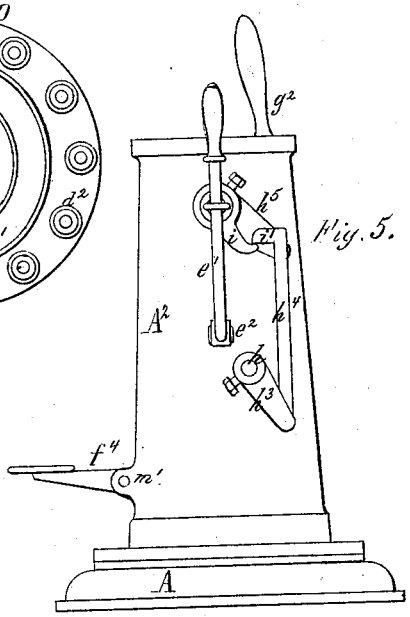



Fig. 5.

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# UNITED STATES PATENT OFFICE

EDWARD HOLMES AND BRITAIN HOLMES, OF BUFFALO, NEW YORK.

## IMPROVEMENT IN MACHINES FOR SAWING BARREL-HEADS.

Specification forming part of Letters Patent No. **166,873**, dated August 17, 1875; application filed August 7, 1874.

*To all whom it may concern:*

Be it known that we, EDWARD HOLMES and BRITAIN HOLMES, both of the city of Buffalo, in the county of Erie and State of New York, have invented certain Improvements in Machines for Sawing Barrel-Heads, of which the following is a specification:

Our invention consists of certain combinations and arrangements of machinery, the nature of which will be best understood from the following description and from the accompanying drawings, consisting of two sheets, in which—

Figure 1 is a side elevation of our improved machine. Fig. 2 is a top plan view, and Fig. 3 is a vertical longitudinal section thereof. Fig. 4 is a transverse section in line *x x*, Fig. 2. Fig. 5 is an elevation of the rear portion of the supporting-frame; Fig. 6, a rear elevation of the movable clamping-head.

Like letters of reference designate like parts in each of the figures.

A is the base-plate of the machine, and $A^1$ $A^2$ two hollow pillars or standards secured thereto. B is the stationary clamping-head turning in fixed bearings *b b* attached to the top plate of the standard $A^1$, and rotated by a screw-wheel, $b^1$, and worm-gear, $b^2$, as clearly shown in Fig. 3. D is the movable clamping-head, arranged in line with the head B, and provided with a hollow shaft, *d*, which is supported in suitable bearings in the standard $A^2$. $d^1$ are elastic points arranged in the head D for clamping the head-blank while being operated upon. They slide in sockets $d^2$ formed on the rear side of the clamping-head, and provided with a spiral or other suitable spring tending to hold the points $d^1$ so as to project from the face of the head D. *e* is the centering pin or rod arranged axially within the hollow shaft *e* of the head D, with its inner pointed end projecting through the latter. It is moved longitudinally in either direction by a bent lever, $e^1$, pivoted to the pillar $A^2$ at $e^2$. *f* is a rectangular box or block arranged on the shaft *d* within the pillar $A^2$, and bearing with its inner end against the hub of the head D. $f^1$ $f^1$ are the two links of a toggle-joint, having its abutment at $f^2$, within the pillar $A^2$, and connecting with the box *f*, so as to slide the same, and the shaft *d* and head D attached thereto in its bearings. $f^3$ is the rod connecting the links $f^1$ to the foot-lever $f^4$, by which the head D is moved toward the stationary head B in clamping the head-blank.

*g* is a spring locking-hook, pivoted within the standard $A^2$ at $g^1$, and engaging, with its lower end, under the inner end of the foot-lever $f^4$, when the latter is fully depressed and the head-blank clamped, so as to retain the clamping-head D in its proper position while the head is being sawed. $g^2$ is a disengaging-lever, connecting at its lower end with the upper arm of the spring-hook $g^2$, so that by swinging the upper end of the lever $g^2$ backward the hook *g* is withdrawn from the foot-lever $f^4$, as shown by dotted lines in Fig. 4, when the clamping-head D is returned to its open position by the reaction of the spring-points *d*. In order to release the head D automatically at the completion of each revolution we employ the following mechanism: *h* is a horizontal shaft, arranged transversely in the standard $A^2$, as shown in Fig. 4, and provided, in front of the spring-hook *g*, with a cam or projection, $h^1$. The shaft *h* carries, on its portion projecting outside of the standard $A^2$, an arm, $h^3$, connected, by a rod, $h^4$, with an arm, $h^5$, mounted loosely on the hollow shaft *d* of the head D. *i* is a cam, secured to the outer end of the shaft *d* in such manner that when the head D is in a closed position, and has about completed a revolution, the cam *i* will engage under a nose or projection, $i'$, on the rod $h^4$, and lift the latter, whereby the shaft *h* is turned, and the cam $h^1$ forced against the spring-hook *g*, so as to withdraw the latter from the foot-lever $f^3$ when the head D is released and returned to an open position. *j* is the cutter-shaft, revolving in bearings $j^1$, formed with the swinging frame J, and carrying at its outer end a circular saw, K, and chamfering-cutters *h*. The shaft *j* is arranged in the same horizontal plane with the shafts of the heads B and D, and is driven by a pulley, $j^2$. *l* is the vertical pivot-pin, forming the fulcrum of the frame J. It is attached to plate L, sliding between longitudinal ways formed in the top of the standard $A^1$ parallel to the axial line of the heads B and D. The central lines of the fulcrum-pin *l* is located in a vertical plane laid through the axial line of the heads B D, and also

passes through the central line of the cutter-shaft $j$, so that the vertical fulcrum on which the saw K swings is located in the point of intersection of the center line of the saw-shaft with the axis of the heads B D.

The saw K is made in the shape of a spherical segment, having for its radius the distance from the saw to its fulcrum, whereby the binding of the saw while cutting is avoided, as the cut is a continuation of the spherical surface of the saw, while, at the same time, a saving in material is effected, as the width of the cut or the set of the saw can be made very narrow.

$m$ is the shaft of the foot-lever or treadle $f^4$, supported in two bearings, $m^1$, secured respectively to the standards $A^1$ $A^2$. $m^2$ is an arm, secured to the shaft $m$ in front of the standard $A^1$, and connecting, by means of a chain or rope, $m^3$, running over a guide-pulley, $m^4$, with a loop on the swinging frame J, so that when the foot-lever $f^4$ is depressed in clamping a head-blank, the frame J is swung inwardly by the same movement, and the cutters K $k$ brought in engagement with the blank. The chain or rope $m^3$ is preferably provided with an interposed spring-coupling, $m^5$, to take up any slack in the rope in adjusting the swinging frame and the sliding pivot-block L, as will presently be explained. $n$ is a weight, attached by a rope running over a guide-pulley, $n^1$, to the opposite side of the swinging frame, and operates to return the latter to its outwardly-projecting position when the clamping-head D and foot-lever $f^4$ are released. $o$ is a pendent pivot-bearing, attached to the under side of the top plate of the standard $A^1$; and $o'$, a bell-crank lever, pivoted to the lower end thereof, with one arm projecting horizontally into the standard $A^1$, while the other arm thereof assumes a vertical direction. $p$ is a lug formed on the under side of the sliding block L, and $p^1$ a screw passing through a threaded hole in the lug $p$, and tripping into the vertical arm of the bell-crank lever $o'$.

By turning the screw $p^1$, the sliding block L, carrying the pivot $l$, is adjusted toward or from the clamping-heads B D, so as to cause the saw K to come in contact with the head-blank at a greater or less distance from the center thereof, whereby the machine is readily adapted to saw heads of different diameters.

$p^2$ is a jam-nut, arranged on the screw $p^1$, and bearing against the lug $p$, so as to lock the screw $p^1$ in its position after having been adjusted. $q$, Fig. 6, is an oval cam, arranged on the rear side of the clamping-head D; and $q^1$, a roller engaging therewith, and turning on the end of a bent rod, $q^2$, the long arm of which extends downward in the standard $A^2$, and connects with one arm of a lever, $r$, pivoted on the under side of the base-plate A, as shown in Fig. 3. $r'$ is a rod, connecting the opposite arm of the lever $r$ with the horizontal arm of the bell-crank lever $o^1$, which is slotted to enable the throw of the lever to be adjusted.

As the head D revolves during the operation of cutting a barrel-head the cam $q$ causes a slight vertical movement of the roller $q^1$ and rod $q^2$, which, through the medium of the levers $r$ $o'$ and connecting-rod $r'$, imparts a corresponding movement to the horizontal sliding block L, thereby changing the distance of the pivot $l$ from the barrel-head being operated upon, which causes the latter to be cut of slightly oval or elliptical form. The head-blank is so arranged between the clamps as to cause the longer diameter of the head to run at right angles to the fiber of the wood. This arrangement for cutting the head compensates for the unequal contraction of the wood, and insures a circular form of the head after it has become seasoned and ready for use. $q^3$ is a weight attached to the rear side of the head D, near the circumference thereof, and in line with the shorter diameter of the cam $q$, so that when the head D is released and opened the weight $q^3$ will insure the latter remaining in such a position that the shorter diameter of the cam $q$ will assume a vertical direction when the head D is in the proper position for the commencement of the next cutting operation. $s$ is a rest or support, consisting of a bar bent to the shape of a right angle and arranged under the clamping-heads B D. The downwardly-extending arm of the bar $s$ turns in a bracket-bearing, $s'$, and has a spiral spring coiled around it. In introducing the head-blank between the clamping-heads B D, it is placed upon the rest $s$, which affords a temporary support for the blank until it is properly clamped. The corners of the blank, while the latter is being rotated, turn the rest $s$ out of the way, and the spring returns it to its former position as soon as it is released. $t$ is the horizontal shaft by which the motion is transmitted to the clamping-head B. It is supported in suitable bearings under the top plate of the standard $A^1$, and carries near its inner end the worm-gear $b^2$, engaging with the screw-wheel $b^1$. T is the driving-pulley, mounted loosely on the shaft $t$, and formed with a conical cavity in which fits the friction-pulley T', which latter is capable of longitudinal movement on a key or feather secured to the shaft $t$. The pulley T is held in contact with the friction-pulley T' by a spring, $v$, arranged on the shaft $t$, between the pulley T and an abutment-collar, $v^1$, secured to the end of the shaft $t$. The friction-wheel T' is retained in its relative position to the swinging frame J by an arm, $v^2$, attached to the latter. $u$ is a hand-lever pivoted to an arm, $u^1$, secured to the standard $A^1$, and connecting with a sliding collar, $u^2$, arranged on the shaft $t$ between the pulley T and spring $v$. By depressing the foot-lever $f^4$, and swinging the frame J inwardly on its pivot for engaging the cutters with the head-blank, the friction-pulley T' is pressed against the loose driving-pulley T, and the motion thereof transmitted by the shaft $t$ and gear-wheels $b^1$ $b^2$ to the head B, while upon re-

leasing the cutter-frame J the friction-pulley T′ is withdrawn from the driving-pulley T, and the motion of the head B stopped.

By pressing the lever *u* outward, so as to release the pulley T from the pressure of the spring *v*, the motion of the head B can be arrested while the head is being cut and without shifting the cutting mechanism.

$w^3$ is an adjustable stop secured to the arm $u^1$ by a set-screw, so as to limit the inward movement of the lever *u*, and prevent the pulley T from following the outward movement of the cutter-frame J in withdrawing from the head-blank.

The head-blanks are prepared by doweling together a suitable number of rectangular pieces of lumber and planing the same on one side, when a punch-mark is formed in the center of the blank on the rough side thereof. The head-blank is now placed on the support *s* between the open clamping-heads, with its rough side toward the head D, and with the grain running vertically. The centering-pin *e* is then pushed forward and the blank adjusted until its punch-mark is entered by the rod *e*, when the foot-lever $f^4$ is depressed, whereby the head D is moved against the head-blank, which is firmly clamped between the spring-points *d* and head B, the cutting operation commencing at the same time. The centering-rod *e* is then withdrawn to its former position.

When the barrel-head is completed the head D is released and withdrawn by the mechanism hereinbefore described, and the barrel-head removed from between the clamping-heads B and D, leaving the parts in the proper position for the reception of a new blank.

What we claim as our invention is—

1. The combination of the clamping-heads, cutter, cutter-shaft, and swinging frame or bearings thereof, with the pivot of said swinging frame or bearings made adjustable in line of the axes of the clamping-heads, substantially as and for the purposes hereinbefore set forth.

2. The combination, with the clamping-head D, toggle-joint $f^1$ $f^3$, and foot-lever $f^4$, of the locking spring-catch *g*, substantially as hereinbefore set forth.

3. The combination, with the clamping-head D and locking device, of the releasing-cam and shaft $h^1$ *h*, arm $h^3$, hooked rod $h^4$, and revolving cam *i*, substantially as and for the purpose hereinbefore set forth.

4. The combination, with the treadle of the clamping mechanism, of the rock-shaft *m*, arm $m^2$, chain $m^3$, spring $m^5$, and swinging cutter-frame J, for simultaneously clamping the head-blank and swinging the cutter in contact with the latter, substantially as hereinbefore set forth.

5. The combination, with the swinging frame and driving-shaft, of the clutch T T′ and clutch-arm $v^2$, substantially as and for the purpose hereinbefore set forth.

6. The combination, with the friction-clutch T T′ and arm $u^1$, of the auxiliary releasing spring-lever *u* and adjustable stop $w^3$, substantially as hereinbefore set forth.

7. The combination, with the sliding pivot-block L and clamping-head D, of the oval cam *q*, roller $q^1$, and mechanism connecting the latter with the block L for cutting the heads slightly oval, substantially as hereinbefore set forth.

8. The combination, with the clamping-head D, provided with the oval cam *q*, of the weight $q^3$, for causing the head D, after being released, to assume the proper position for the next cutting operation, substantially as hereinbefore set forth.

9. The combination, with the swinging frame and sliding pivot-block L, of the chain $m^3$, connecting with the treadle and provided with a spring for taking up the slack thereof, substantially as hereinbefore set forth.

10. The spring head-rest *s*, arranged so as to be swung out of the way by the head-blank as it revolves, substantially as herein shown and described.

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