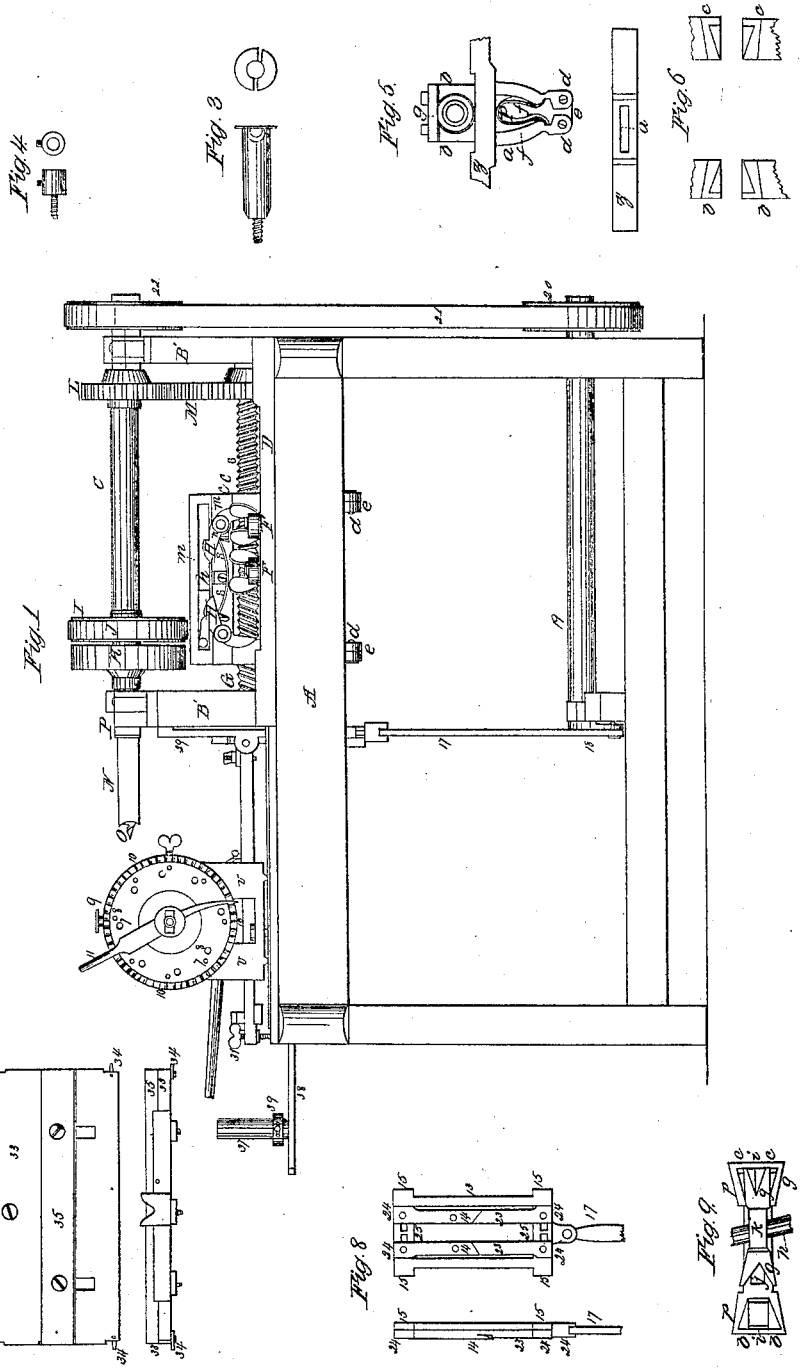
Sheet 1-2 Sheets.

Martin & Richtmyre,

Mortising Machine,

No. 1,241, Patented July 16, 1839.



Sheet 2 - 2 Sheets.

Martin & Richtmyre,

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Fig. 1

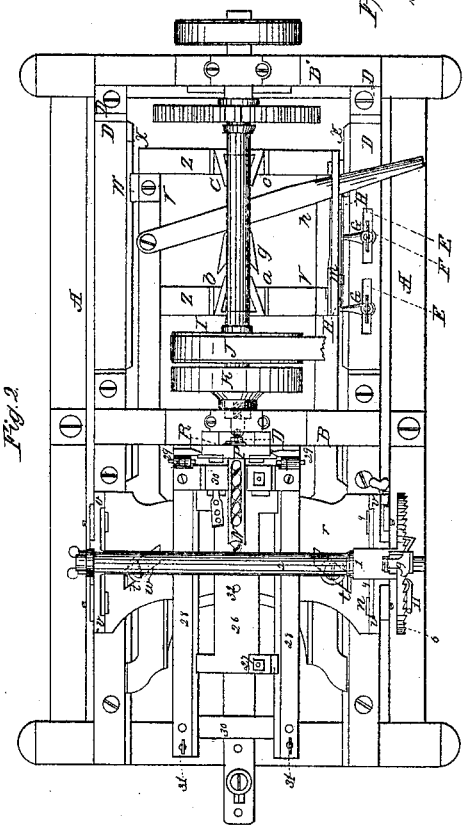
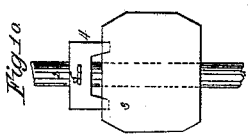


Fig. 2

Fig. 10



UNITED STATES PATENT OFFICE.

B. RICHTMYRE AND JAS. H. MARTIN, OF CONESVILLE, NEW YORK.

MACHINE FOR MORTISING, TENONING, AND BORING.

Specification of Letters Patent No. 1,241, dated July 16, 1839.

To all whom it may concern:

Be it known that we, BARNT RICHTMYRE and JAMES H. MARTIN, of Conesville, in the county of Schoharie and State of New York, have invented a new and useful Machine for Mortising, Tenoning, and Boring, which is described as follows, reference being had to the annexed drawings of the same, making part of this specification.

Figure 1 represents a side view of the machine; Fig. 2, a top view; Fig. 3, instrument for cutting round tenons; Fig. 4, the socket to receive the various cutting tools; Fig. 5, section showing one of the divided nuts and right and left screw; Fig. 6, top view of the divided nuts; Fig. 7, top and side view of table to receive the timber to be cut; Fig. 8, gate and cutters for making tenons; Fig. 9, top view of forked slide and divided nuts; Fig. 10, mandrel, hub, and dog; Fig. 11, side view of spring stop.

The same letters of reference refer to the same parts represented in the several figures.

The frame A for containing and supporting the several parts of the machine, hereinafter described, is made of wood of sufficient size and strength for the purpose intended. The one represented in the drawing is composed of four posts, two side rails, two end rails, two caps and two parallel longitudinal beams framed into them and a timber extending from one side rail to the other for supporting one end of the crank axle hereafter described.

A metallic frame B, for supporting the main shaft C is cast of proper size and strength and screwed to the top of the main frame; it extends from the rear end to the center; it consists of two longitudinal plates D, and two curved bolsters B for supporting the boxes of the journals of the main shaft C which boxes are made in the usual manner. Two oblong mortises or slots E, Fig. 2, are made in each of the side plates to admit the shanks of thumb screws F, Fig. 1, to which are attached stop G, Fig. 2, for tripping certain spring catches H, Figs. 1 and 2, hereafter described, which stops being moved to the right or left as desired according to the depth of mortise required by means of the slots and screws E, F.

The main shaft C is made about half the length of the machine and of any suitable diameter and strength. It is turned in the before described boxes by means of a fast pulley I on it and a band J leading to the driving power. A loose pulley K is also placed on said shaft to which the band is shifted when it is required to stop the machinery. This shaft may be turned by a crank on one end thereof or by cogged gearing; it has a cog wheel L on it which meshes into another cog wheel M which turns a right and left screw S hereafter described for advancing and receding the carriage. For boring a square hole a four sided bit N is used with an auger O, Fig. 2, in the center of the same. The square part or stock N is let into a metallic plate P and brazed securely. This plate is screwed or bolted to the outside of the bolster B. A round aperture is drilled through said plate for the shank of the auger to turn in, on which shank is slipped a collar R, and then a pin is inserted through said shank and keyed in against said collar. The end of the shank is made in the form of a tenon T which fits into a mortise in the end of a horizontal screw U, (represented by dotted lines,) which is screwed into the end of the main or driving shaft C and by which the auger is turned while the four sided bit remains stationary. When a round tenon is to be made the square auger and mortised screw just described must be removed and a round hollow auger, such as represnted at Fig. 3, must be screwed in its place, and whevener it is required to change the cutting tool a socket such as that represented at Fig. 4 may be screwed into the end of the main shaft C and the required tool secured in said socket.

The carriage V, Fig. 2, on which the timber to be mortised and tenoned is secured and advanced to or receded from the cutters is composed of two horizontal parallel longitudinal plates grooved on the outside thereof with triangular or other shaped grooves or finished with studs W, which are similarly grooved, moving over triangular or other correspondingly shaped ways X formed on the edges of the parallel plates D screwed to the top of the main frame. Said parallel plates of the carriage V are connected together by cross plates or bars Z. On two of these cross bars are oblong mortises *a*, Fig. 5, to receive two divided female screws or nuts *bb*, *cc*, Figs. 1, 2, 5, 6 and 9, which move on pivots *d*, *d*, inserted through

the ends of the parts of said nuts and into plates P projecting downward from the under side of said mortised cross bars.

Z, Figs. 2 and 5, represents a side and top view of one of the bars.

Each divided nut is composed of two casting *b b*, and *c c*, which are cut spirally on the inside and when closed together form a right and left female screw for moving over the right and left male screw.

The two parts of each nut are thrown asunder by a spring *f*, Fig. 5, placed between and resting against the aforesaid castings. They are closed alternately by a double forked slide *g*, moved by a lever *h*, against a triangular or wedge shaped projection on top of each part of each nut *b b*, *c c*.

A plate *p*, Fig. 9, having a trapezoidal opening *i*, *i*, at each end to receive the triangular necks of the nut just described rests upon the shoulders of said nuts. This plate likewise is perforated with a rectangular opening *j* in which there moves a small tenon projecting down from the forked slide *g* into said opening to guide the slide. The lever *h* for moving the forked slide to the right or left passes through a mortise *k* in said slide and moves on a pivot *l*, Fig. 2, inserted into the top of a post erected in one side of the carriage. On the opposite side piece of the carriage is erected a vertical plate *m*, Fig. 2, containing a horizontal opening *o*, Fig. 1, in which the lever *h* moves to the right or left, and to the side of said plate are attached the spring catches H for holding the lever, the position of which spring catches being shifted horizontally by having the shanks of the screws of the catches to pass through horizontal slots *n*, Fig. 1, in said plate *m* and said catches are thrown up by springs *s*, *s*, placed under them. They are depressed by their shanks coming in contact with the stops G, Fig. 2, before described. The right and left screws *s s* on which these split nuts *b*, *b c c* move for advancing and receding the carrage turns in boxes fixed on the top of main frame—it has a cog wheel M fixed on it into which the pinion L works fixed on the main shaft as before described.

A horizontal plate *r*, Fig. 2, is placed across the rear end of the carriage having segment slots *t t* in it to receive screw bolts *u* for securing it to the sides of the carriage V and allowing of its position to the right or left being shifted at pleasure. This plate is turned up at right angles at each end forming end plates *v* in which are mortises *w* to receive slides *x* moving vertically in said mortises and held at any required height by screws *y* passing through slots *z* in said slides and into the end plates. In these slides are secured boxes No. 1 in which a mandrel 2 turns on which the hub 3 to be mortised is secured, which is effected by a double dog 4 driven into the hub, which dog is prevented from turning on the mandrel by a thumb screw 5 passing through said dog into the mandrel. One end of said mandrel is turned down small to receive a circular index plate 6 perforated on the back with two concentric circular rows of cavities 7 and 8 into which a spring stop 9, Figs. 1, 2, 11, is passed to hold said index plate at the required position for mortising it, the outer row being for the purpose of determining the distance apart of the mortises of the spokes of the hind wheel and the inner row that of the fore wheel. The other side of said index wheel is notched as at 10 to admit a latch 11 attached to the mandrel to take into the notches for turning it, which latch is furnished with a handle for the operator to take hold of to move it. In moving said latch it strikes against the spring gage or stop 9 pushes it back, disengages the lock pin on spring stop 9 from the index wheel 6, and then takes into one of the notches and causes the wheel to turn, and the wheel being fixed to the mandrel causes it with the hub to turn the required distance for a new mortise.

For cutting the tenons on the large ends of the spokes a gate 13, Fig. 8, something like a saw mill gate is made use of containing two chisels 14, 14, which cut away the wood at the sides, leaving the tenon and shoulders. The gate is extended in width and grooved on the sides with triangular or other shaped grooves at 15, which move over correspondingly shaped ribs 29 fastened vertically to the frame and bolster. The gate is made rectangular and is moved up and down by means of a pitman rod 17 attached to it and to the wrist of a crank 18 on a horizontal shaft 19, below which is turned by a pulley 20 end band 21 leading around a pulley 22 on the main or driving shaft. The cutting tools or chisels 14 are fastened to two vertical parallel bars 23 fastened to the gate by screw bolts 24 passing through slots 25 in the cross bars of the gate by which they can be advanced nearer or receded farther from each other at pleasure according to the size of tenon required. The spoke to be tenoned is made fast upon a slide 26 in any convenient mode resting against a gage 27 fastened to said slide and against a gage on a cross bar hereafter described. This slide is grooved on its edges and moves over two parallel bars 28 hinged to gate posts 29 before described and connected together by cross bars 30 the loose ends of said bars being raised or lowered by means of thumb screws 31 trimming on the top of the frame in order to set the spoke at the required angle to have the tenon cut thereon to a proper bevel.

The slide is connected to the carriage by a vertical pin 32, which pin passes through said slide 26 and passes into an aperture

in the horizontal plate *r* which is fastened to the carriage V and moves backward or forward with it. After the tenons are cut on all the spokes they are driven into the hub and the round tenons cut on the small ends (which enter the fellies) in the following manner. The mandrel and circular index plate are removed and a horizontal table 33, Fig. 7, secured between the end plates *v* before described fastened to the carriage by means of pins 34 in the ends of the table entering corresponding apertures in the vertical gage 35 and guide plates 36. The hub is placed on a vertical pin 37 inserted into an horizontal arm 38 projecting from the rear end of the carriage V and rests upon a horizontal circular gage 39 secured at any required height on said pin by thumb screw and in such position that the spokes shall rest at the required position on the table and as the wheel is turned horizontally that the end of each spoke shall be brought in a line with the axis of the main shaft C into which the round hollow auger Fig. 3 is secured for cutting the round tenon on each spoke. When one tenon is cut the wheel is turned horizontally until the next spoke is brought in the same place and so on until all the spokes are tenoned. The arm to which the vertical spindle is fixed is attached to the carriage by slot and screw so that it can be extended or contracted at pleasure according to the size of the wheel.

Operation: For mortising hubs the machine is arranged as represented at Figs. 1 & 2; the hub 3 is fixed on the mandrel 2 by means of the dog 4 which is prevented from turning by the screw 50. The hub is presented to the cutting tool N, O, at the required angle, according to the required set of the spokes, by means of the segment slots *t* and screw bolts *u* which allow the plate *v* with the mandrel, &c., to be moved obliquely to the right or left to any required angle. The mandrel, carrying the hub, is prevented from turning by the stop 9 taking into a cavity on the back of the circular plate 6 said plate being fastened to the mandrel and the stop being fastened to the box. The lever *h* is moved to the left which carries with it the forked slide *g*, one end of which embraces the wedge shaped ends of the divided nut *b*, *b*, and closes them on the left hand-screw which (when the machine is in motion) and the other nut *c c* is open will cause the carriage V with the mandrel hub, &c., to advance toward the cutting tool, the square part of which remaining stationary the lever is prevented from moving to the right by the spring catch H. Motion is then given to the revolving part of the cutting tool or auger O by means of a band J passed around a pulley I fixed on the shaft C carrying the auger, and extended to the propelling engine—moved by steam, water, or manual power. As soon as the hub in advancing touches the auger the cutting commences and continues until the mortise is cut the required depth; when the advance of the hub will be stopped by the tail of the spring catch coming in contact with the gage stop G which trips the spring catch and disengages it from the lever which is thrown to the right by the spring *f* of the split nut throwing its parts asunder and causing their inclined or wedge shaped ends to press against the inclined sides of the forked slides and thus push them apart, disengage the nut from the screw and stop the advance of the carriage. These gage stops G, G, determine the depth of the mortises. By moving them asunder the depth is increased—by advancing them decreased—because the nuts are held a longer or a shorter time in gear with the right or left screw by means of said gage stops tripping the catches of the lever as required—sooner or later as required.

In moving the lever *h* back to the right it closes the parts of the nut *c*, *c*, in a similar manner over the right hand screw which reverses the motion of the carriage and runs the hub back from the cutting tool. The operator then takes hold of the latch 11 and moves it to the left which movement pushes back the spring stop 9 and disengages it from the circular plate 6 and at the same time takes hold of a tooth of the plate and causes it to move round to the left the distance required for another mortise. The plate, mandrel, and hub being all connected together of course they will all move together. The hub being adjusted for another mortise the lever *h* is again moved to the left and held by the spring catch H which movement throws the nut *c c* out of gear with the right hand screw and into gear with the left hand screws which will cause the carriage again to advance while the auger cuts another mortise in the same manner as before described, and so on until all the mortises are cut. The slides, mortises, and screws *u*, *v*, *y*, are for adjusting the height of the hub at one or both ends as required.

To cut the square tenons on the spokes the mandrel must be removed and the spoke secured to the slide 26 by the hand of the operator or by a lever, and its position adjusted for the proper angle of the tenon in relation to the angle of the mortise in the hub into which it is to be inserted by means of the adjusting screws 31 which elevate or depress the ends of the hinged bars 28 on which the slide moves. A band 21 is then put around the pulleys 20 and 22 which will put the gate in motion carrying the cutters for cutting away the sides of the spoke and leaving the tenon between them. The slide 26 being connected to the carriage V by

means of the pin 32 will advance with the spoke as the carriage advances in the manner before described. The spokes being all tenoned are inserted into the mortises of the hub and made fast. The round tenons are next cut on the small ends of the spokes in the following manner. The mandrel being removed the table 33 is placed between the plates *v v*, the point 34 on said table being inserted in apertures in said plates. The hub is then slipped over the spindle 37 and rests upon the movable collar or gage 39 which is adjusted to a proper height by the screw passing through said collar. Each spoke is then placed in the notch of the guide plate 36 and brought up to the cutting tool in a line with the axis of the main shaft C. The cutting tool in this case is the circular bit represented at Fig. 3. The spindle 37 being fast in an arm 38 of the carriage of course the hub and spokes will advance toward the cutter in the manner before described for mortising. The hub is turned horizontally on the spindle in order to bring the spokes successively in a line with the cutter.

The table 33 and gage 35 are used for mortising and boring various kinds of timber.

It is not intended to be limited in the construction of this machine to any particular dimensions, or kind of materials, or arrangement of parts but it is meant to vary these if required to suit circumstances without, however, intending to change the principle of the machine.

The invention claimed and desired to be secured by Letters Patent consists:

1. In the particular construction of the split nuts in combination with the bars Z, springs *f*, trapezoidal mortises *i*, forked slide *g*, right and left screw S for advancing and receding the carriage as described and when thus combined in combination with the arrangement of the stops G, for tripping the spring catches in liberating the lever, and disengaging the nuts from the screw, and the mode of adjusting the same for determining the depth of mortise as described.

2. The construction of the plate *r* and the method of adjusting the same for presenting the hub to the cutting tool at a proper angle, in combination with the mandrel, slides, dog, circular index wheel, spring stop and latch as described.

3. The table 33 and mode of arranging the same as described in combination with the uprights *v v*, as herein described.

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JAMES H. MARTIN.

Witnesses:
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WM. H. RICHTMYRE.