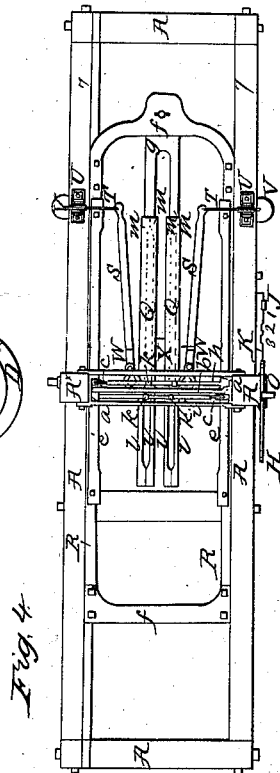
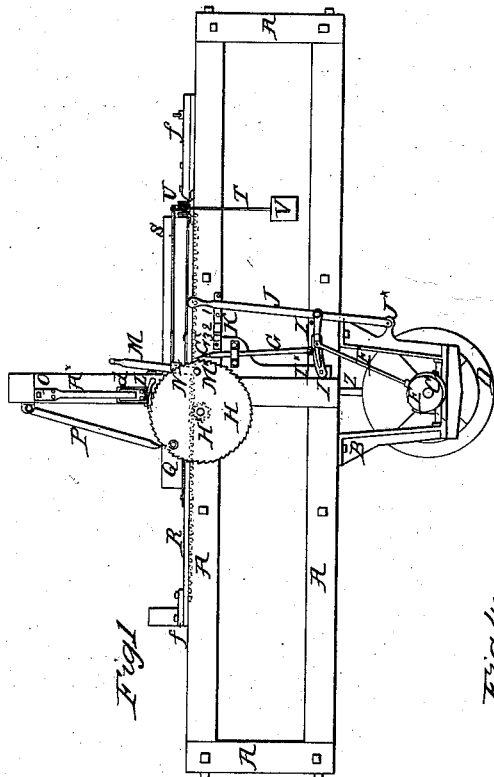


11 Sheets, Sheet 1.

J. Hamilton,
Dressing Staves.

N^o 8,873.

Patented Apr. 13, 1852.

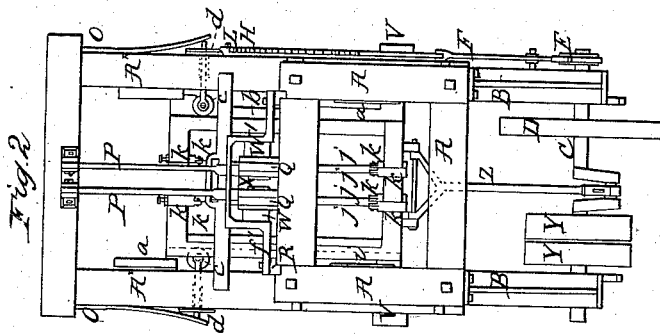
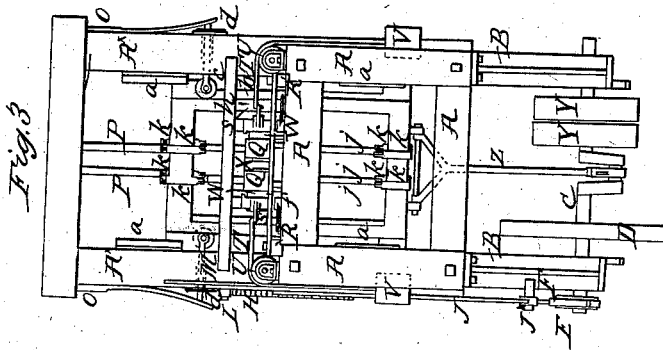


J. Hamilton, 11 Sheets, Sheet 2

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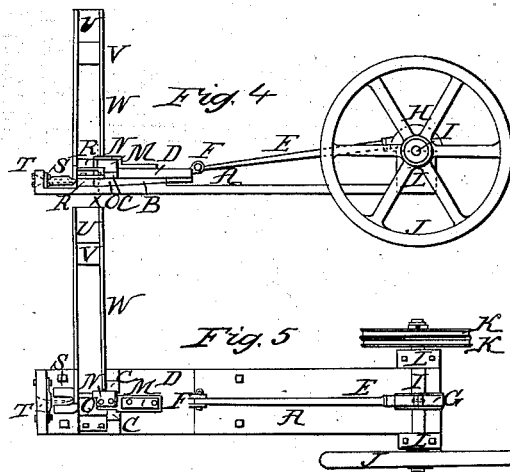
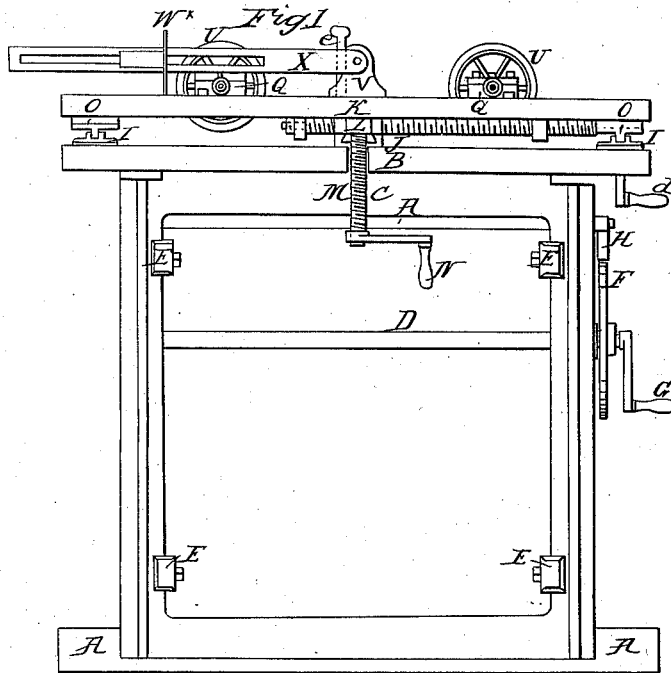
Patented Apr. 13, 1852.



J. Hamilton,
Dressing Staves.

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J. Hamilton,
Dressing Staves.

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Patented Apr. 13, 1852.

Fig 3

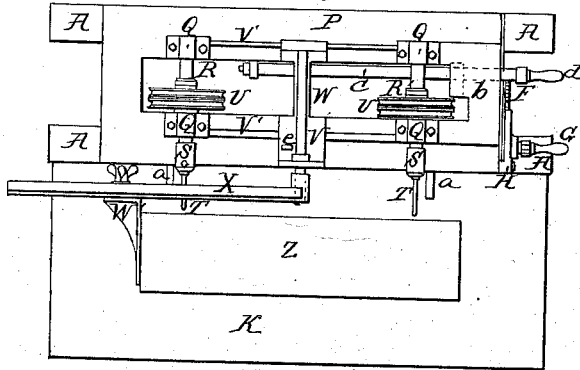


Fig 2

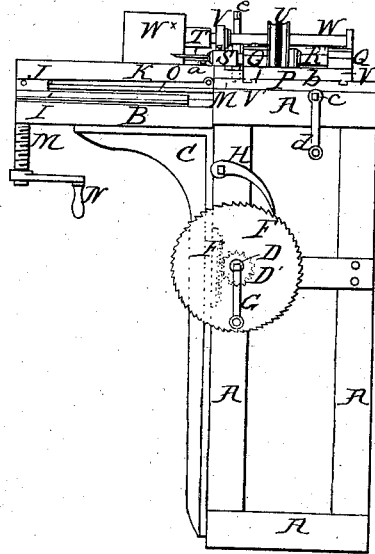
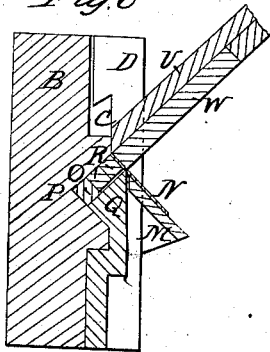
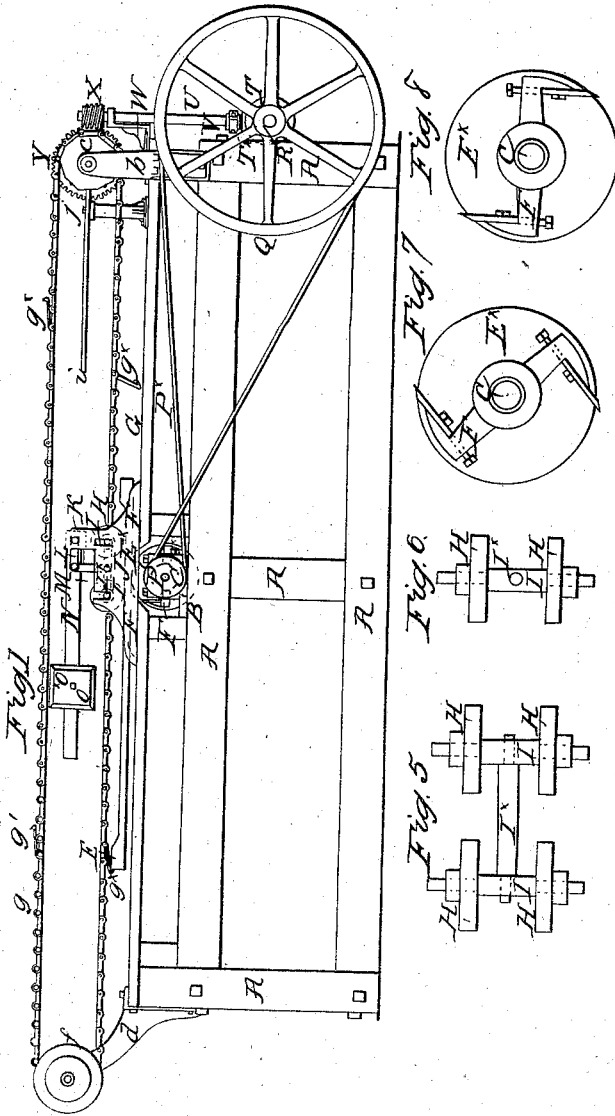


Fig 6



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Dressing Staves.
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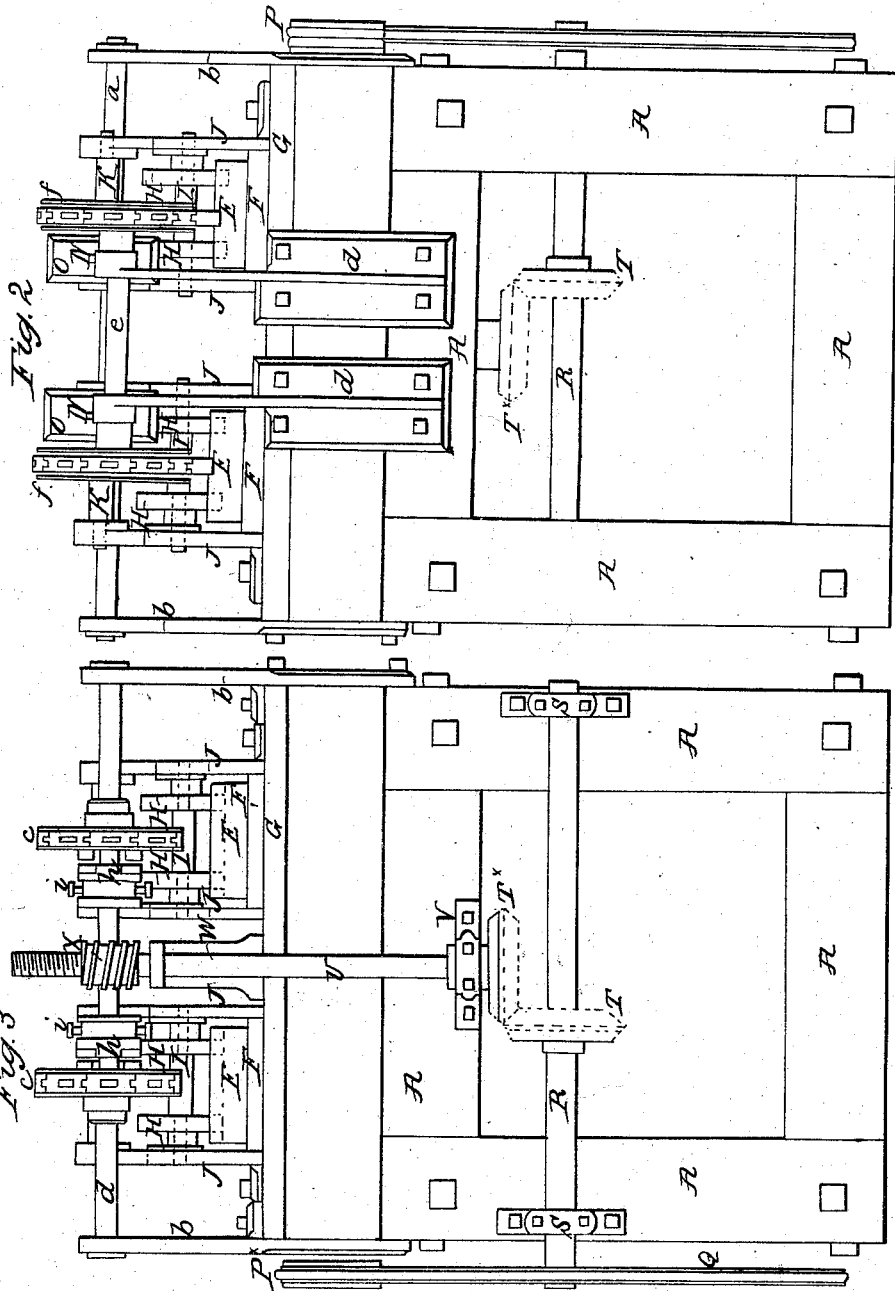


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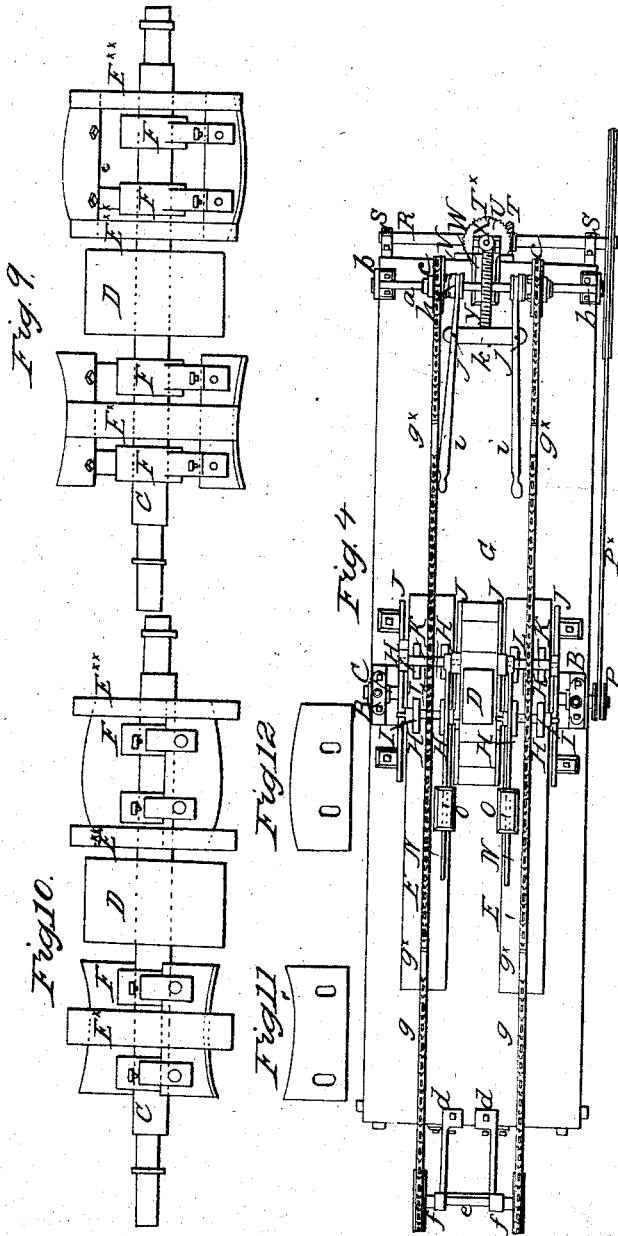


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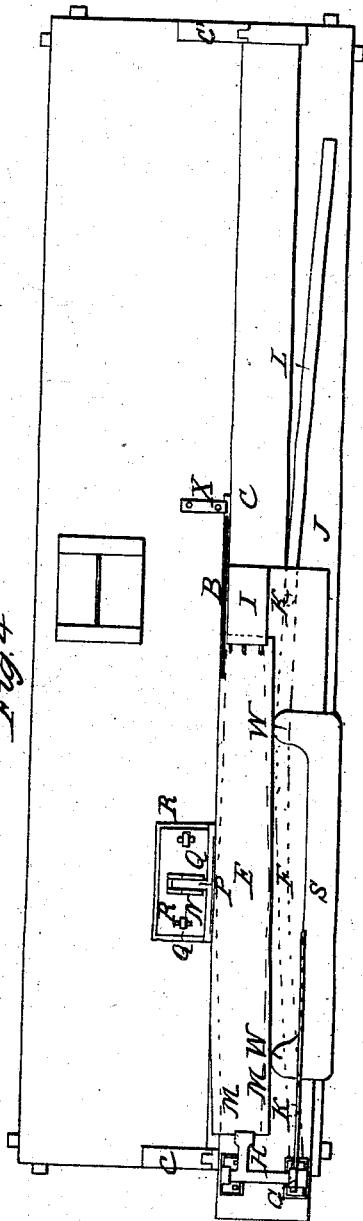
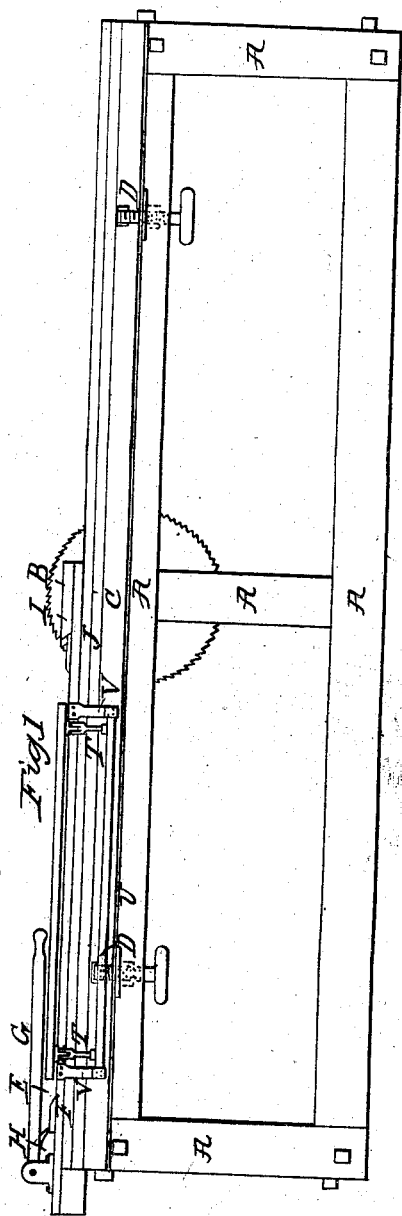


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Dressing Staves.

No 8,873.

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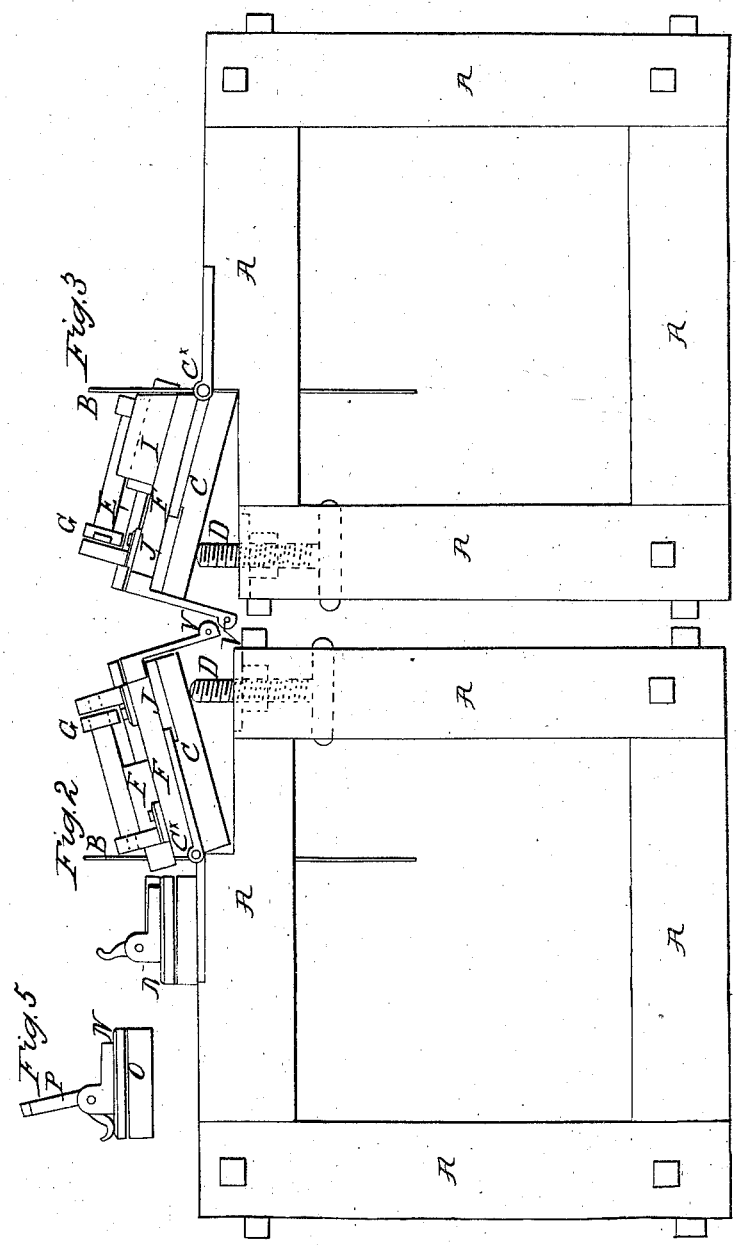


J. Hamilton,

Dressing Stares.

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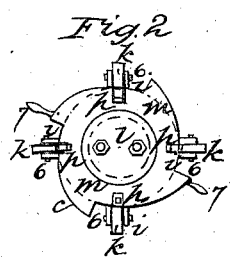
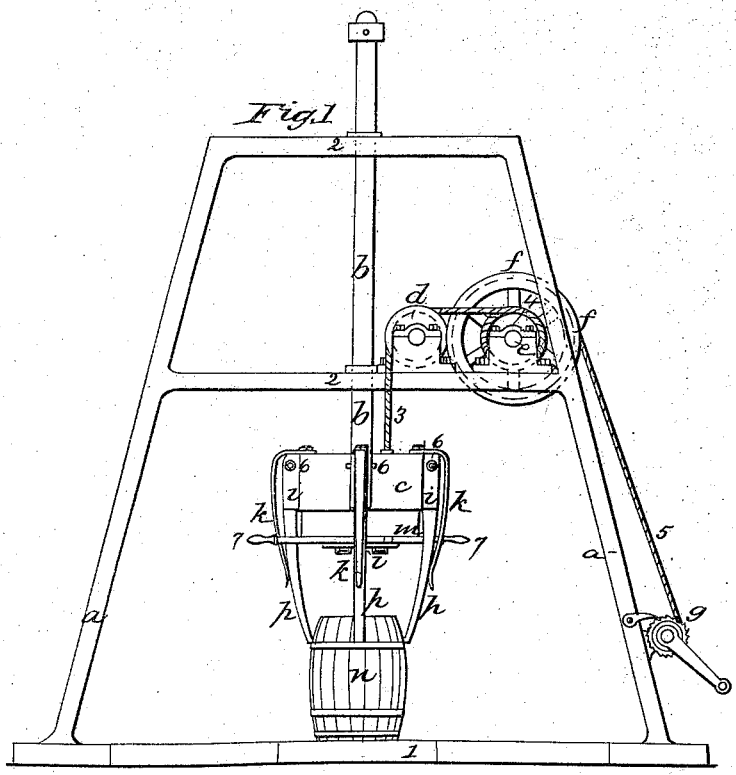


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J. Hamilton,

Dressing Stares.

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Patented Apr. 13, 1852.

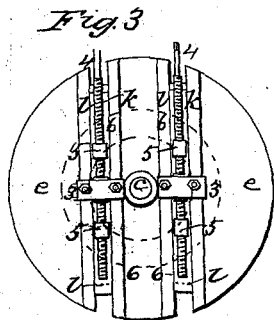
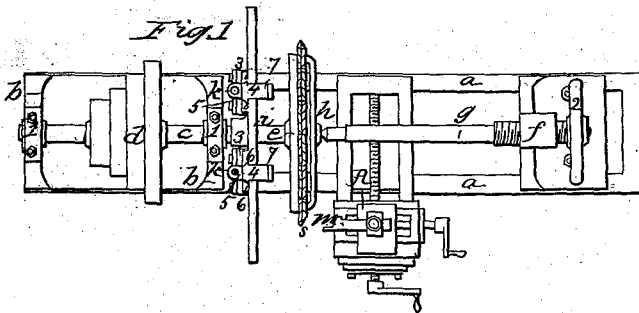
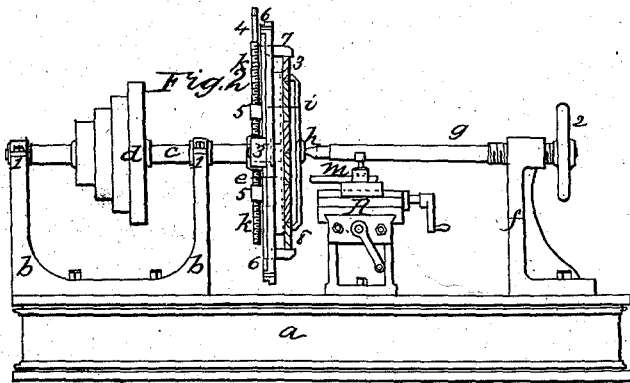


J. Hamilton,

Dressing Staves.

No 8,873.

Patented Apr. 13, 1852.



UNITED STATES PATENT OFFICE.

JAS. HAMILTON, OF NEW YORK, N. Y.

MACHINERY FOR MAKING CASKS.

Specification of Letters Patent No. 8,873, dated April 13, 1852.

To all whom it may concern:

Be it known that I, JAMES HAMILTON, of the city and State of New York, in the United States of America, but now temporarily residing in England, have invented new and useful Improvements in Machinery for Sawing, Boring, and Shaping Wood for Casks, and that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, and to the figures and letters marked thereon, that is to say—

My invention consists first of improvements in machinery for sawing wood for the staves of casks.

Secondly my invention consists of improvements in machinery for boring wood for the purpose of inserting dowels in the making of casks.

Thirdly my invention consists of improvements in machinery for giving to wood the required form and the proper bevel at the edges for staves of casks and fourthly my invention relates to machinery for setting and forcing the hoops on the casks and barrels, and finally my invention relates to machinery for compressing together the doweled pieces constituting the heads of casks or barrels preparatory to turning the same.

Description of the drawings Sheet 1.—Figure 1 is a side view of machinery used in sawing wood for staves. Figs. 2 and 3 are end views. Fig. 4 is a plan. The same letters and figures on this sheet refer to the same parts. A A A A is the frame. A^x is one of two fender posts. B B are two hanging brackets firmly bolted to the bottom of the machine for supporting the crank shaft. C is the crank shaft. D is the fly wheel. E is the eccentric. F is the eccentric rod. G is a bar with a pawl G^x jointed on its end and working the ratchet wheel H. This bar is connected at its lower end to a slotted lever I working on the pin I^x. The lever is connected to the eccentric rod by a pin passing through the slot and the upper end of the eccentric rod. The pin passes through two links I^o which connect the eccentric rod F with the lever J. The lever J turns on its lower end on a pin J^x. K is a graduated notched plate fixed on the side of the frame A and marked 1, 2, 3. It will be seen that by moving the lever J into Fig. 2 it will increase the stroke of the bar G and give an additional feed and by moving it into Fig. 3

it increases it still more making it convenient to increase or decrease the feed at pleasure. L L are two pawls working in the ratchet wheel to prevent it receding when at work. M is a lever turning on the pin M^x at its lower end. N is a thin piece of steel running between the ratchet and frame and so shaped as to strike pins placed in the pawls lifting them out of gear by moving the lever M in one direction and throwing them into gear by moving the lever M in the reverse direction. O is a steel spring screwed to the fender posts A^x (described in Fig. 2). P P are two pawls resting on the wood when being sawed to prevent it being lifted up by the saws. Q is the wood being sawed. R is the rack or carriage which is moved backward and forward by pinion H^x. S is a press lever described in Fig. 4. T is a cord fastened to the end of lever S and running over pulley U with a weight V attached to press the rollers W W (Fig. 4) against the wood Q which is guided by the fence plate X. Fig. 2 is an end view. Y Y are the fast and loose pulleys. Z is a connecting rod or pitman connected with the crank C at its lower end and at its upper end to the center gate *b* which moves up and down in guides *a, a, a, a* which are screwed or bolted upon the fender posts A^x A^x. On each side of this gate is another gate fully described in Fig. 4. *c, c,* are two rollers placed in the ends of two forked sliding pieces. These sliding pieces pass through the fender posts A^x A^x and are pressed up against the two sliding gates by means of the springs O O. Two metal boxes *d, d* are inserted in the fender posts A^x A^x for the roller slides to pass through and be kept accurately in their places. One of these rollers presses against the front sliding gate, as the gate is worked up and down and the other roller presses against the back gate *i* causing the gates to be kept against and guided by the templets *e, e* seen in Fig. 4 as the sawing progresses. It will readily be seen that the direction of the saw will be guided by the templets *e, e*. These templets may be varied in shape as required for the particular work. Fig. 3 is a view of the front end and is fully described in Figs. 1 and 2. Fig. 4 is a plan. A A A A is the top frame. *f* and *f'* are two pieces or head blocks connecting the rack R R or carriage frame in which the wood is placed to be sawed. *g* is a forked piece of wood attached to the connecting end *f* for

the purpose of pushing the wood forward. Q Q are the timbers being sawed. X is a fence plate. W W are two rollers pressed up against the wood Q Q by means of the levers S S more fully described in Fig. 1. 5
e, e are the templets screwed firmly to the carriages R R. *b* is the center gate running up and down in the guides *a, a*. *h* is the forward sliding gate. *i* is the back sliding gate. These two gates are fitted to the rear and front of the center gate *b* by dovetail pieces similar to those of a slide rest of a lathe and made to move freely to the right and left being governed by the templets *e e* and the pressing rollers *c c*. These gates 10
 being connected in the manner set forth are governed in their up and down stroke by the center gate *b*. The front and rear gates have each two saws *j j* (seen in Figs. 1 and 2) stretched in them by buckles *k k k k k k* 15
k k which are made to slide freely on the top and bottom of each gate enabling a workman to set them at any given distance apart. It will be seen in this arrangement as shown in the plan that two saws are stretched in the front gate and two in the rear. Consequently the forward saws enter the wood about two inches before the wood comes up to the rear saws which are so set 20
 as to enter and follow in the cuts made by the front saws and it will be seen that the front saws having entered a distance begin to diverge to the left hand and when the rear saws arrive at the same point they begin to diverge to the right hand as shown by the lines *l l l l* and continue to make their cuts until they arrive near the end of the wood at which time the saw gates are pressed in by the templets *e e* which cause the cuts 25
 at each end to be like those shown by the dotted lines *m m m m* and corresponding with the cuts *l l l l*. Instead of employing two saws in each gate as above described it will be obvious that one three or more saws 30
 may be employed also that the cuts whether straight or curved will depend on the forms of the templets.

I would remark that I am aware that it has before been proposed to cut wood for the staves of casks by means of two saws made to enter and leave the wood at the same time and capable of diverging and converging when sawing but in the arrangement above described the saws enter and leave the wood one behind the other which is advantageous and the mode of employing the parts S W X enables wood to be sawed up into staves and also into pieces useful for the heads of casks. 35

The machinery as shown and described is arranged so that the saws enter and leave the wood in the same cut but it will be obvious that by different forms of templets the saws of the two gates through coming into action in succession may enter and 60
 leave the wood in different cuts also that

where one cut only is required through one piece of wood one saw only in one of the gates will require to be employed.

Description of the drawing Sheet 2.—
 Figure 1 is a front view of machinery for boring staves and parts of heads of casks and like purposes. Fig. 2 is an end view. Fig. 3 is a plan. In these figures the same letters and figures refer to the same parts. 70
 Fig. 1, A A A A, is the framing. B is a table or platform screwed or bolted on bracket frame C. C is an iron framing made to rise and fall by means of a rack and pinion as shown in Fig. 2. D is a shaft with pinions keyed on and gearing into racks placed on the inner sides of frame C. The frame C is made to move up and down and is guided by clamps E E E E bolted to framing A A. On the end of this shaft is a ratchet wheel F and crank handle G. H is a pawl for the purpose of retaining the ratchet wheel F in its place enabling the workman to raise or lower the table B to any required height. On the top of table or platform B are two slide guides I I. 75
 There is also in the middle of table B a dovetail sliding guide J. In the end of dovetail slide J is a nut L through which passes a screw M. N is its handle enabling the workman to give the upper bench K any inclination or angle required for boring staves or other pieces of wood to receive dowels. In each of these guides are slides with hinged joints bolted to an upper table K. On the top of the frame A A is a bed plate P (seen in Figs. 2 and 3) on which are plumber blocks Q Q. R and R' are two mandrels running in plumber blocks Q Q Q Q (seen in Figs. 2 and 3) having chucks on their ends for receiving boring bits T T (seen in Figs. 2 and 3). U U are fast and loose pulleys for working mandrels R and R'. V is a carriage sliding in dovetail grooves V' V' (seen in Figs. 2 and 3). This carriage has a shaft W made to turn to the right or left by the slotted lever X which is connected to the shaft W. In this slide is a fence or stop piece W^x made to move either to or from the fulcrum on which the slotted lever X turns and is fastened in its place by a nut Y (seen in Fig. 3). Z (seen in Fig. 3) is a piece of heading resting on table K one end being against this fence W^x in a position to be bored for the dowels. It is now to be pushed up by the hand to stop pieces *a a* giving equal depth to each hole. The slotted lever W^x is then to be turned over upon the other end of the table K. The wood is then to be turned end for end (keeping the same side up) and the end of the heading is to be guided by fence W^x the same as before giving uniformity to the surfaces holes and ends when united. The mandrel R' runs in a sliding head *h* and can be moved. 80
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to or from the mandrel R by means of the screw *c* and handle *d* enabling the workman to regulate the distance from hole to hole as may be required. Whenever any change is made in the distance the holes are required to be apart the sliding carriage V is to be moved to the center and fastened by the thumb screw *e* being of equal distance from mandrel to mandrel or bit to bit. The fence piece W* is to be set corresponding with the length of the heading or material to be bored. When casks are required to be made of an oval or irregular circular form it is desirable that the staves should be doweled together. Consequently they must be bored at a given level. In such case it will be seen that ample provision is made for this purpose by means of the table K being made capable of adjustment to any given bevel or angle required by means of the screw M. The table K is then to be drawn out and the stave placed upon it and pressed up against the boring bits. It will be seen that staves so bored will have their holes so perfectly agreeing as to receive dowels without the risk of their being bent or broken in putting the casks together. Fig. 2 is an end view. A A A A is the frame. B is the table or platform bolted to bracket slide C. D is the pinion shaft. D' is the pinion. F' is the rack referred to in Fig. 1. F is the ratchet wheel. G is its handle. H is the pawl. I are the slide guides. J is the dovetail guide. K is the table top on hinged points M*. M is a screw for raising the table K. N is its handle. O are the jointed slides. P is the bed plate having dovetail grooves in it for the purpose of adjusting the distance from one bit or auger to the other. Q Q are the plumber blocks in which the mandrel R' revolves. S is a chuck to receive the boring bit and screwed on the end of the mandrel R'. T is the boring bit. U U are the fast and loose pulleys. V is a sliding carriage. W* is the fence. X is the slotted lever. Y is the nut to fasten the fence in its position (seen in Fig. 3). Z is the wood to be bored. *a* is a stop piece. *b* is the mandrel sliding carriage. *c* is the screw. *d* is its handle. *e* is the thumb screw for fastening the carriage V in its place. Fig. 3 is a plan and is fully described in Figs. 1 and 2. The bands for working the mandrels R and R' are driven by the same pulley which may be placed either above or below the machine.

I would remark that I am aware that drilling machines each having two or more drills simultaneously put in action have before been made and used for drilling wood for casks and other purposes. I do not therefore claim the same and I would state that this part of my invention consists in combining with such machinery means such

as herein described for adjusting the distance of the drills for adjusting the wood on the table and for adjusting the table as herein explained.

Description of the drawing Sheet 3.—Fig. 1 is a side view of machinery for backing and hollowing staves Fig. 2 is an end view Fig. 3 is a view of the other end Fig. 4 is a plan. In these figures the same letters and figures refer to the same parts Fig. 1. A A A A A is the framing. B is one of the plumber blocks in which the shaft C revolves. On the center of this shaft is a fast pulley D. On each side of this pulley and directly under the staves E E as indicated on the plan are two sets of revolving adzes F placed on the shaft C in the usual way. One set of cutters on one side of the pulley D have convex edges and the set on the other side of the pulley D have concave edges each being adapted to the diameter of the cask to be made. In the center of the concave adzes is a wheel E* seen in Figs. 9 and 10 being of the same diameter as the cut of the adzes. This wheel is to prevent the wood being cut below the surface of the center of the stave as it passes through the machine and as the cutters curve up on each side of this wheel it gives the desired form to the stave without wasting the strength of the timber or stave in its middle. The same arrangement is made on the other side of the pulley D for hollowing the staves, the only difference being that for hollowing a stave convex cutters are used instead of concave and two wheels E** are employed in the place of the wheel E* as seen in Figs. 9 and 10. E is a stave being backed or rounded on its outer surface according as the concave or convex cutters are used. The stave slides over two short pieces F F secured on the top G of the machine one in front and the other in the rear of the adzes or cutters their upper surfaces being nearly the same height as the cutters (shown in Figs. 11 and 12.) H H are two of the rollers pressing the stave firmly down and keeping it in its place when being operated upon. 4 rollers are required for this operation as shown in Fig. 4—two only are shown in this view they are connected together by 3 axles (shown in Figs. 5 and 6 and marked I I I*. These rollers are kept in their places by the axles I I being of a sufficient length to pass through each roller into the slots in the side guides J J J J (Fig. 4). These two axles I I are connected together by a third axle I*. Over the back axle is a shaft K the bearings of which work in the same side pieces as the axles I I of the pressing roller H. H. On the center of the shaft K is an arm L which is connected to stirrup M. Its other end is connected to the center of the axle I*. On the shaft K is another lever N. On this lever

is a weight O capable of sliding either way on the lever N, giving more or less pressure on the rollers H H H H as may be required. This weight is kept in its place on the lever N by means of a set screw O*. It will be seen that as the pressure is on the center of the axle I* each and all of the rollers turning freely on their own axles will receive an equal pressure from the weight O. On the end of shaft C is a pulley P. P* is a band. Q is a groove pulley keyed on to shaft R which runs in plumber blocks S S bolted on to the back end of frame A A, as seen in Fig. 3. T, is a bevel wheel keyed on shaft, R which gears into another bevel wheel T*. This bevel wheel is keyed on the end of worm shaft U, which runs at one end in plumber block V fastened to the plane A. The other end runs in a bracket W bolted upon the top G, of the frame A A. Upon the upper end of shaft U is a worm X which is geared into worm wheel Y. This worm wheel is keyed upon the middle of shaft a. This shaft runs into two brackets b, b, which are bolted to the side frames A A. Between the worm wheel Y and brackets b b, are two chain wheels c c. At the other end of the frame A A are two brackets d, d strongly bolted upon the extreme end of the frame A A. Through these brackets is a shaft e, on the ends of which are flanch pulleys f f. g, g, are two flat endless chains with a mortise in each link which fit on to the chain wheels c, c, regularly when the wheels are in motion. The chain wheels, c, c, are loose on the shaft a, and are brought into action by the clutches h, h, and levers i, i as seen in Figs. 3 and 4. The fulcrums of these levers i, i, turn on screws j, j, in the brackets k. On each endless chain g, g, are four hooks g* g* g* g* more or less which drop on and take hold of the ends of the stave E, as the chain passes around and draws the stave E through between the cutters F, and press rollers H H H H. It will be seen that when the pulley D, is put in motion by means of a band in the usual way it gives action to the various parts connected with it and forces the staves through the machine and gives them the desired shape or form they being rounded on the back or hollowed in the belly according to the cutters used. Fig. 2 is an end view and fully described in Fig. 1. Fig. 3 is a view of the other end, and is also described in Fig. 1. Fig. 4 is a plan fully described. Fig. 5 is a plan and Fig. 6 an end view of the press rollers H H H H and axles I I I*. Figs. 7, and 8 show two views of the adzing frames. Figs. 9 and 10 show two views of the axis C, with two sets of adzes thereon one set for hollowing and the other set for backing. Figs. 11 and 12 show the two descriptions of cutters employed.

Description of the drawing Sheet 4.—
 Fig. 1 is a side view of a circular saw bench for beveling and shaping wood for staves. Figs. 2 and 3 are end views. Fig. 4 is a plan. In these figures the same letters and figures refer to the same parts. Fig. 1, A A A A A, is the frame. B is a circular saw hung in the usual way. C is a bench hung on hinges at the edge by means of hinged joints C* C* seen in Figs. 2, 3 and 4 and made to rise or fall by means of screws D D, they giving any required bevel to the stave E. F is a frame on which the stave is fastened by means of a lever G operating upon the clamp H, which is pressed firmly upon the end of the stave E the other end of the stave being pressed up strongly against the dog I. J, is a templet which guides the sliding frame F, by means of rollers or guides K K seen in Fig. 4 running in the templet or groove L. N is an apparatus for regulating the quantity of waste timber to be sawed off the edge of the stave and is fully shown in end view Fig. 5. O is a guide plate with grooves in it to give stability and correctness to the upper piece N which is made to slide in it the upper plate N has two slots in it R R through which pass two set screws Q Q. The plate N has a jointed guide P with arms (shown in Fig. 4) which is made to rise and fall as required. It will now be seen that the plate N having on it the guide piece P can be moved either backward or forward as required giving the exact amount of wood to be sawed off the edge of the stave. This apparatus is to be screwed on the top of the bench where the stave is confined (as described before) to be sawed. S is a gaging piece hung on joints T T. These joints are screwed into shaft U which turns in brackets V V. These brackets V V are screwed firmly to and move with the sliding frame F pushed up against the guide piece P and confined as before described by lever G when one edge has been sawed the stave is then reversed which brings the sawed side next the gage piece S it is then pushed up against the guide piece P by means of the gage piece S confined by the lever G and sawed as before. The points W W of the gage piece S are so arranged as to be at the same distance from the cut of the saw as they respectively arrive at it. The stave consequently will be the same width at one end as the other when sawed. X (Fig. 4) is a wedge piece for the purpose of throwing off the waste piece of the stave and giving freedom to the action of the saw when making its curves. When the stave is confined in its place as described it is pushed forward by hand against the saw which gives the required form as shown by the dotted lines M M and at the same time the proper bevel. It will be readily under-

stood that by substituting other templet in place of templet J, and required form may be given to the edge of the stave and by such means of combining parts a saw bench is constructed suitable for shaping and beveling staves for casks by means of a circular saw.

I will now describe drawing No. 2. Fig. 4 is a side view of the machine for making dowels or pins. Fig. 5 is a plan. Fig. 6 is a section. In all these figures the same letters are used to represent the same parts. A is the bed or foundation plate. B is a projection on the top of which are two dovetail guides C on which is a slide D fitting and moving thereon. This slide D is jointed to the connecting rod E by means of a pin F. The other end of the connecting rod E is connected to the eccentric band G (see Fig. 5) which is worked by the eccentric H on the shaft I, on which is a fly wheel J and a fast and loose pulley K K. L L, are plumber blocks. On the side D is bolted the piece M for the purpose of carrying the cutter N (see Figs. 5 and 6.) On the underside of the slide D is a square punch or driver O (see Fig. 6) running in a groove P (Fig. 6). In the projecting piece B the punch or driver is fixed to the slide D. Q is a cap or guide piece bolted upon projection B for the purpose of guiding and keeping in its place the piece of wood R R (Fig. 6) cut or split off square by the cutter N falling down exactly in line with the punch or driver O, when the cutter N is drawn back. S is a hollow die or cutter bolted to the flanch T. This cutter is bored out smoothly for the required size of the dowel or pin and made sharp at the end at which the wood enters. U is a trough standing at an inclination with the bed plate A of about 45 degrees and of sufficient width to receive the piece of wood W to be split into pieces of the required size as it is pressed down by the weight V. W is the wood of the required length and thickness for the dowels. Three square pieces (only two are seen) R R of the required dimensions for each dowel are first to be placed in the receiving aperture. Then the wood W, is to be placed in the trough U and the weight V placed on its top to bear it down as it progresses. It will readily be seen that by putting the machine in motion that each revolution will press through the hollow cutter S one of the pieces of wood R R in the receiver, it at the same time will cut or split off another piece from the wood W to supply the place of the piece already driven through and so on in succession until all the wood W is used up.

Sheet 5, represents part of my improved machinery for making casks and shows the means for driving the hoops on the casks. In this sheet Fig. 1, is a side elevation of the

apparatus complete, and Fig. 2, is a plan from beneath of the arms that drive the hoops on; 1, is a foot piece or platform carrying two posts *a, a*, connected by cross pieces 2, to form a frame to receive the parts, this may be either wood or metal. Through the cross pieces 2, 2, are slides receiving a vertical shaft *b*, that can move freely in the slides. *c*, is a weight of any proper size to which a rope 3, is attached passing over a pulley *d*, and secured to a barrel 4, on a shaft *e*, the end of which receives a pulley *f*, around which a cord 5, is wound and one end secured, the other end passes to a winch *g*, which may be of any proper character that will enable the workman to raise or lower the weight *c*, through the means described or any other competent means. On the sides of the weight *c*, are parallel guides *i*, receiving three, four or more arms *h*, but here shown as four depending from the weight *c*, curved inward, the ends being formed square to take the hoops, these arms *h*, are attached by and move on pins 6, passing through the guides *i*. *k, k*, are springs operating to force the arms *h*, together. *l*, is a circular plate screwed on the under side of the weight *c*, having a flanch that retains between it and the weight *c*, a disk *m*, the edges of which are formed as cams (the same number as there are arms *h*,) that increase in size from the size of the weight *c*. 7, 7, are handles on opposite sides of the plate *m*. It will now be seen that by turning the plate *m*, the cams on its edge will take the arms *h*, and either open them wider or allow the springs *k*, to force them together. *n*, represents a barrel with the hoop being driven on.

The way of using this apparatus is as follows; the staves being set together have the hoop placed over them and the plate *m*, is turned by the handles 7, to bring the ends of the arms *h*, to the right distance apart. The workman then lowers the weight *c*, which forces the hoop down nearly into place, and the weight may be slightly raised and allowed to fall if desired and the final operation of driving can be effected by a swage and hammer as usual and I would here remark that in large casks two workmen are required to drive the hoop on opposite sides to prevent it rising up and getting loose, but in my apparatus the weight *c*, resting on the hoop at different points through the arms *h*, holds the hoop to its place while the workman drives it tightly on.

I do not limit myself to the number of arms *h*, but intend to vary these according to circumstances.

Sheet 6, of my improved machinery for making casks shows means for forming the heads so that the slats of the heads are clamped together, then rotated and cut of the required size by a proper tool. In this

sheet Fig. 1, is a plan, Fig. 2, is a side elevation of the machine complete and Fig. 3, is a back elevation of the clamping chuck. *a*, is a suitable bed carrying a mandrel head 5 *b*, with journals 1, 1, which receive the mandrel *c*, on the middle of which are conical pulleys *d*, *d*, and the nose of the mandrel carries a face chuck *e*, the face of which is turned with grooves around near its outer 10 edge and also turned slightly dishing in the middle, see dotted lines in Fig. 2, the object being to allow the parts of the head to take a fair and even bearing near the edge of the face chuck *e*. Near the other 15 end of the bed *a*, is a puppet head *f*, sustaining a screw mandrel *g*, on the line of the mandrel *c*, and on one end of this mandrel *g* is a hand wheel 2, by which it is to be turned; the other end is to be formed as a 20 point which takes a socket on the cross clamping piece *h*, which is formed with lips or beads on the ends that take the slats of the head and force them onto the chuck *e*, as the clamp *h*, is operated on by the screw 25 *g*, and the socket on the clamp *h*, taking the end of the screw mandrel *g*, the head 8, chuck *e*, and clamp *h*, can be rotated together by power applied to the pulleys *d*.

In putting the slats of cask heads together 30 considerable pressure is required to force the dowels and slats together or when the head is brought together by the hoops of the cask it will be oval, being compressed crosswise of the grain of the wood. In my machine 35 this compression is effected before the clamp *h*, is brought up to clamp the head by the following means.

The mandrel *c*, is of sufficient length between the chuck *e*, and journal 1, to receive 40 a loose chuck *i*, that can be slid on the mandrel *c*, close to the chuck *e*, or slid back out of the way as seen in Fig. 1. On this chuck *i*, are two journals 3, taking the necks of two parallel right and left handed screws *k*, one 45 end of each screw being extended to form a square 4, to take a key or crank by which it may be turned, these screws are retained in place by shoulders on each side of the journals 3. 5, 5, are nuts on the screws *k*, 50 connected to slides *l*, set in fixed slides *b*, on the back of the chuck *i*, the outer ends of these slides *l*, are formed as hooked clamping points 7, which pass through notches or 55 openings in the chuck *i*, between the ends of the slides *b*. The mode of using this is as follows; the chuck *i*, is slid on the shaft *c*, to the chuck *e*. The points 7, now projecting beyond the face of the chuck *e*, receive between them the slats to form the head which 60 are to be doweled together in any usual manner. The screws *k*, are now to be turned so as to draw the nuts 5, toward the center of the chuck, the slides *l* and points 7, moving toward each other giving any desired pressure 65 across the grain of the wood to clamp

the slats together with whatever pressure desired; the head is then to be secured by the clamp *h*, as before described, then rotated and turned off by a proper tool so as 70 to make the head round.

m, is a cutter on an ordinary slide rest A, 70 by which the tool is moved and directed while cutting the slats to form the head of the required diameter, and form the bevel 75 on the inner side of the head. When the head is thus turned the chuck *i*, is to be slid back on the mandrel *c*, out of the way to allow a slight bevel to be formed on the outer side of the head by any proper cutter or tool. And in some cases after the slats 80 are clamped together and the clamp *h*, secured to place the chuck *i*, may be slid back before the cutting is commenced.

Having thus specified the various parts of my invention and the manner of constructing and using the same, what I claim as 85 my invention and desire to secure by Letters Patent, is as follows, viz:

1. The sawing of two staves from one 90 block by means of two saws which in succession enter the same kerf, then in succession diverge in opposite directions and finally converge and pass out of the same kerf, substantially as specified the two saws 95 being mounted substantially as specified, so that they can be moved laterally in opposite directions, in combination with the templates or their equivalents for giving the required lateral motions to the saws as the 100 block of wood is moved forward toward the saws, substantially as specified.

2. In the machinery for boring holes for 105 dowel pins, I claim the arrangement of the mandrels carrying the bits on separate slides to admit of varying their distance apart, substantially as specified in combination 110 with the reversible fence or gage hung to a rock shaft mounted on a slide between the mandrels and provided with the means of adjustment, substantially as specified, by 115 means of which the bits can be set at pleasure to bore the holes at any desired distance apart, and on the two edges to correspond the distance being gaged from the same end, with the view to economize timber, as specified.

3. In the machinery for jointing staves, I 120 claim in combination with the circular saw and the hinged carriage which is governed by guides to determine the form to be given, as described, the employment of the gaging 125 apparatus to determine the quantity of stuff to be cut off, and the gage piece with its two points and made adjustable on the carriage, substantially as specified by means 125 of which combination the quantity of stuff to be cut away from each edge is regulated to prevent waste, and an equal width of the two ends secured when cutting the second 130 edge, as set forth.

4. In the machine for setting up the staves and driving on the hoops, I claim the spring arms jointed to the weight or head on the sliding shaft, or the equivalents thereof, the said arms being formed with lips inside to support the hoop while setting up the staves, as specified, when the said arms are combined with the cam plate, or the equivalent thereof for the purpose of liberating the arms from the hoop that they may be employed for driving on the hoop, substantially as specified.

5. And finally in the machinery for turning the heads, I claim in combination with the face chuck for receiving the head, and the clamping piece for clamping it against the chuck, substantially as specified, or the equivalents thereof, the employment of the jaws operated by screws or their equivalents for the purpose of forcing together the different pieces constituting the head, preparatory to clamping them on the chuck and turning the head, substantially as and for the purpose specified.

JAMES HAMILTON.

Witnesses:

JOHN L. SMITH,
J. T. CLORE.