

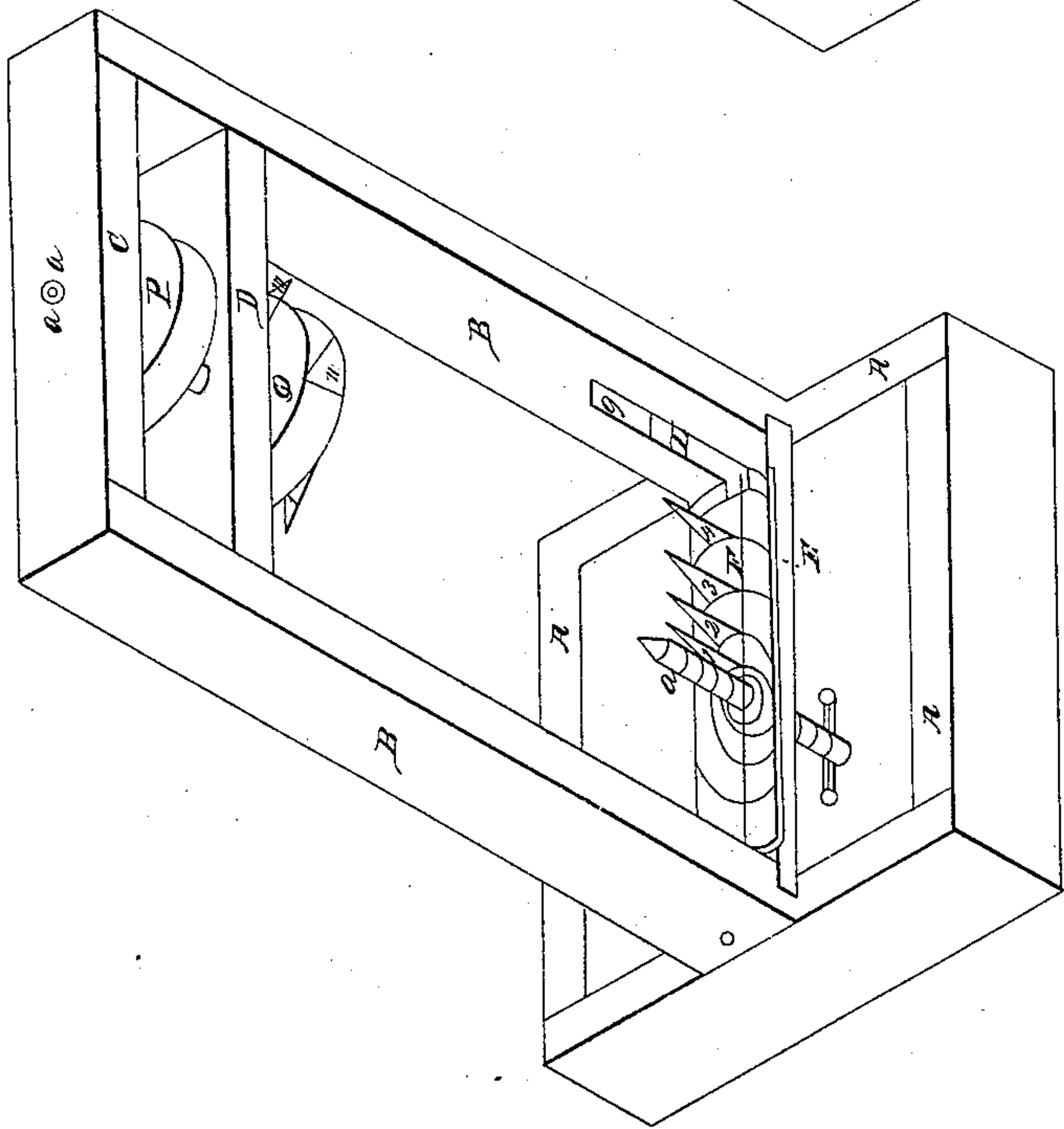
*D. Pierce,*

*Making Wooden Trays.*

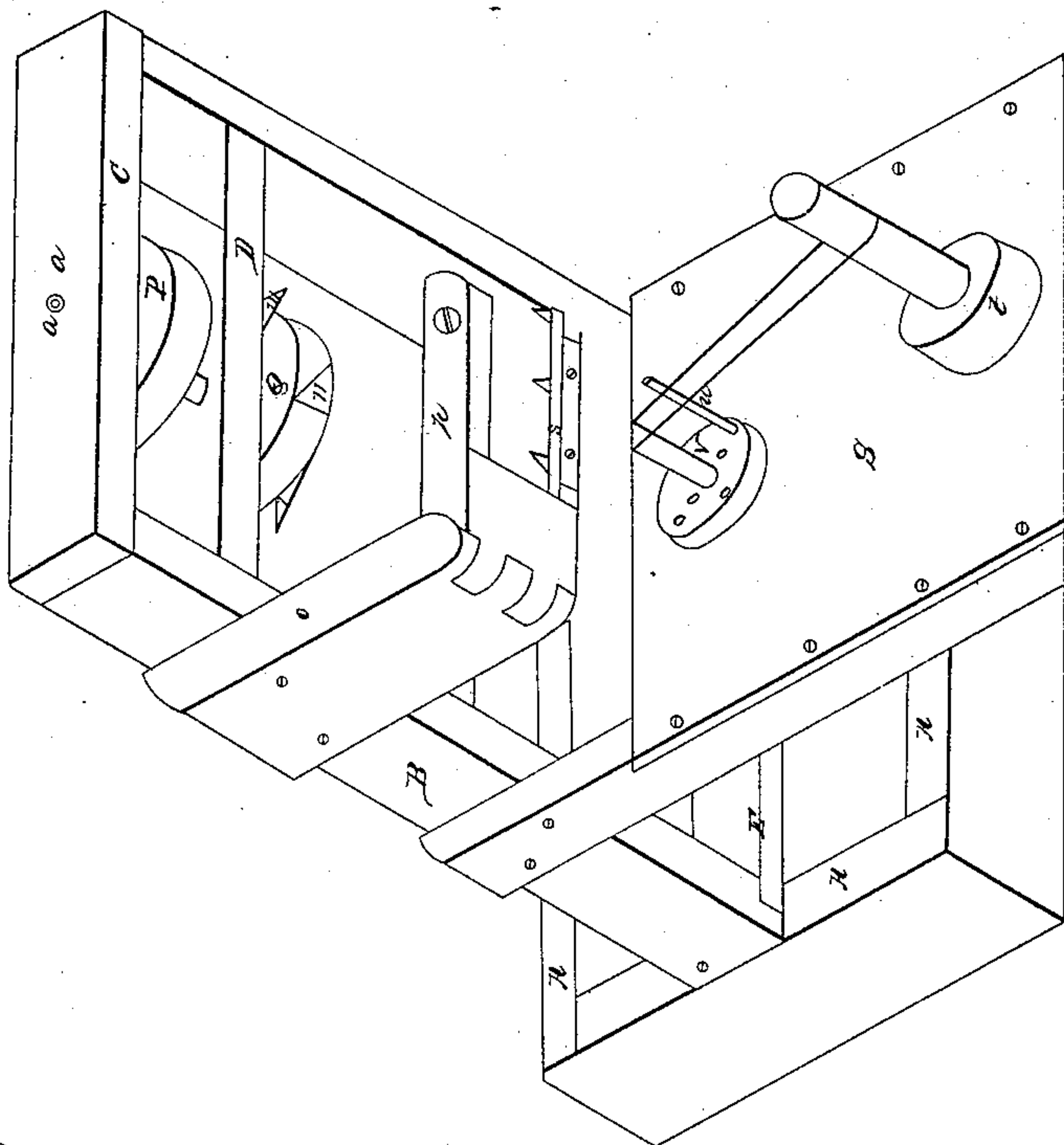
*N<sup>o</sup> 13,099.*

*Patented June 19, 1855.*

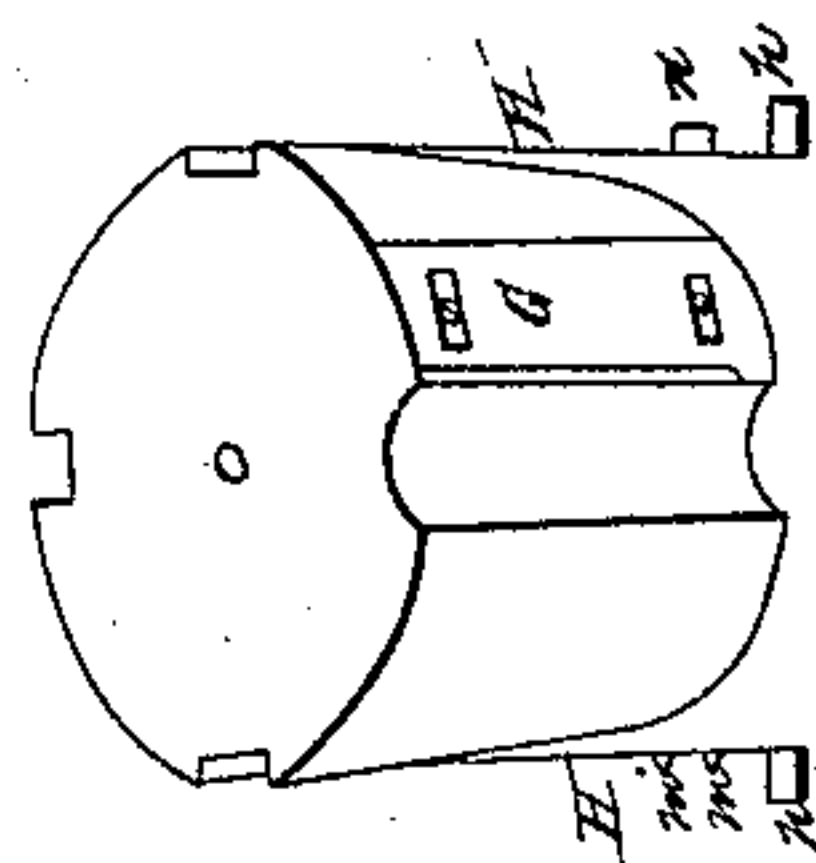
*Fig 1.*



*Fig 2.*



*Fig 3.*





# UNITED STATES PATENT OFFICE.

DAVID PIERCE, OF WOODSTOCK, VERMONT.

## MACHINE FOR MANUFACTURING WOODENWARE.

Specification of Letters Patent No. 13,099, dated June 19, 1855.

*To all whom it may concern:*

Be it known that I, DAVID PIERCE, of Woodstock, in the county of Windsor and State of Vermont, have invented a new and  
5 useful Machine for Making Woodenware, which I denominate the "Cooper's Lathe"; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings,  
10 making a part of this specification, in which—

Figure 1, is a perspective view; Fig. 2, a perspective view of the lathe with the  
15 crane and tether table attached with the apparatus to be used in finishing circular and elliptical heads; Fig. 3, a perspective view of the core with which to turn out the inside of the pail or vessel to be finished, in which  
20 references by letters and figures are made to various parts of the machine.

The nature of my invention consists firstly, in the construction and application of machinery adapted to cut out cylinders  
25 from blocks of wood, of the following form, and in the way described as follows, viz: Let a frame of six feet in length, and thirty inches in width in the clear be constructed of solid planks, three inches thick and  
30 twelve inches wide, well fastened together with joint bolts or otherwise. This frame is designed to give attachment and support to two upright posts, with their appendages, as hereinafter described. The posts are to  
35 be five feet ten inches long, twelve inches wide and four inches thick, of firm solid timber. The two posts are to be united together, two feet asunder, by cross planks or ties, by joint bolts, as securing the greatest  
40 strength, in the following manner, viz: The two posts are connected together at one end, by a plank three inches thick, more or less of the width of the posts, let into each post by tenons or otherwise, so as to leave the  
45 posts two feet asunder. Six or more inches from this plank, place another similar one and in the same way. The two planks are designed to furnish bearings for the spindle of a gang of pulleys, to run between them,  
50 as well as to tie the posts together. The two posts, thus connected, are to be let into notches, cut at right angles to the frame, and in the center thereof, the frame being firmly bolted to the posts, which rise per-  
55 pendicularly from it. Notches are to be cut, in a horizontal direction in the post,

into which the lower cross plank may easily be moved, for the purpose of adapting the tail spindle which passes up through it to the length of the block or work to be done. 60 The notches are cut so deep, as to permit the tail spindle to be moved to the right or left, sufficiently to secure any desired degree of taper, for the work to be done. Upon this plank is to be placed the sliding rest, hold- 65 ing the cutting tools, or saws to be hereinafter described. Into the center of each end of this bottom cross plank is inserted a joint bolt. To turn a cylinder tapering, the tail spindle is to be moved to the right or 70 left by means of the joint bolts in the ends of the plank.

The sliding rest is of the following description. It must be of sufficient strength to hold and guide the tools firmly without 75 yielding, while the block revolves against the cutting tools.

For a lathe of the above described size and form, the sliding rest should be made of iron, wrought-iron to be preferred, not 80 less, than one inch thick and four inches wide and two feet long, equal to the space between the posts. At each end of this bar of iron, in the center thereof, a lip one inch square is to be formed, which will make the 85 entire length of the rest twenty-six inches. These lips should be some three or four inches in length, turned up at right angles with the upper surface of the body of the rest, and parallel with each other, and nicely 90 adapted to run in perpendicular grooves, let into the posts at each end of the rest.

The grooves are designed to guide the rest in its upward motion toward the block or other work to be done, and with it the cut- 95 ting tools. This effect may be secured by guide rods, or by other means. In the center of the rest and perpendicular to its upper surface should be formed an elongated orifice, a little wider in its shortest diameter, 100 than the diameter of the tail spindle, which will pass through it, and in its longest diameter sufficient to admit the spindle to be removed to the right or left so far as to secure the desired taper for any cylinder. This 105 cross plank is notched into the posts and is shorter than the space between the bottom of the notches, or their outer surfaces by some three inches, which will admit a lateral movement of the plank one and a half inches 110 to the right or left. This lateral motion of the tail spindle will secure all the taper de-



sired. The posts of this lathe are of a height sufficient to admit a block of the length and size of a barrel. Place this block upon the tail spindle, while standing in the same plane of the pulley spindle and the direction of the cutters will be parallel with the center of the block and the cylinder will have no taper. If now the tail spindle be moved to the right or left the line of the cutting tools will form an angle with the center of the block and will cut out a tapering cylinder. A gang of cutters, sufficiently numerous to cut the block into concentric cylinders, by one operation should be used, and of half the length of the block. They are to be made of the following form. They must rise above the sliding rest nearly one half the length of the block and be firmly fixed to the rest. The cutting tool next the tail spindle should be a little longer than the others, so that the center of the block may be cut quite clear from the gang of cylinders outside of it, while they remain united in the center.

The form of the tools or cutters should be as follows, and be made as thin as may be, without trembling, while being worked. For heavy work, as cutting a cylinder for a barrel, one fourth of an inch thick will be sufficient, thirteen or fourteen inches high. The cutters should decrease in thickness from the front to the rear, and have a curvature of a segment of the circle of the cylinder to be cut. The top may be an inch or less from front to rear, while the bottom may be several inches, every part of which must be kept within the curvature of the circle of which it is the segment. The sliding rest should be marked with circles, or such portions of circles, as the width of the rest will admit, the marking to be of the width of the cutting tool, and so deep, as to aid in holding it in place. The gang of cutting tools are to be placed at distances from each other, to correspond to the desired thickness of the cylinder, which may be different in different articles. The cutting portion of the tools may be various. A square chisel point, a gouge point, a saw or two spurs at the front angles of the cutter and a narrow cutting chisel point back of them may answer; something depending on the nature of the material to be cut.

The machine is to be worked in the following manner. Let the tail spindle pass up through the elongated orifice of the rest, the lips being nicely fitted in the grooves in the posts or guided by rods and the rest can be moved in only one direction, which is parallel to the center of the spindle, when the tail spindle occupies the center of the rest. This will bring the cutting tools perpendicular to the lower end of the block; this position and direction being preferred, as more readily permitting the chips and saw dust to

pass off from the cutters. Various means may be used to propel the cutters to the block or other work to be done. The rest may be moved by hand; or by screws turned by hand or by other means, but a better way is to attach two cords or chains, one at each end of the rest, and to pass them over a pulley to be turned by weights suspended from the other ends of the chains or cords. In this way the cutters may be borne against the block, with any force which the driving belt will carry and always with an equable motion, and though a gang of cutters will not advance so rapidly as a single cutter would, yet the same amount of work will be done, and to better purpose, and the cutters will be less liable to tremble, the resistance being divided among all the gang. To facilitate the use of these cutters and prevent the waste of timber by cutting a wide channel, the cutters should ordinarily pass a little less than half the length of the block, when it should be reversed and the cutters applied to the other end in a direction to meet the channels already cut; the cutters still stopping a little short of the center, so that the concentric cylinders shall not separate until seasoned.

The first operation upon the block, after it is placed in the lathe should be to cut off the ends of the block, and then to turn the outside of the largest cylinder or the block, when it will be prepared for the cutting tools.

The cylinders are to be finished, prepared to receive the bottom in the following manner. Suppose the article, to be finished, be of the size and taper of a pail. Let there be made a core of wood, with an iron center adapted to be attached to the pulley spindle of the lathes, of the size and form of the interior of the pail, but somewhat longer; and also adapted to rest upon the tail spindle of the lathe. Longitudinally on one side of the core, let there be a semicircular excavation from end to end of the core, sufficiently large to receive the chips or cuttings to be turned off the interior of the cylinder. On one side of the excavation from end to end of the core, sufficiently large to receive the chips or cuttings to be turned off the interior of the cylinder. On one side of the excavation, and parallel to it, place a cutter of the length of the cylinder embedded into the core, so as to bring the cutting edge a little past on one edge of the excavation. The cutter is to be finished on the outside with the same circular form and taper of the core and furnished with slots to admit screws, which are to attach it to the core and permit the edge to be carried forward or the reverse.

On the opposite side of the core, a piece of iron, one half inch wide of the length of the cutter and one fourth of an inch thick,



having a smooth exterior, is let into the core and so attached to it, that it can be extruded a little beyond the periphery of the core, by the operation of spring beneath it.

- 5 The springs operating upon the iron bear the cylinder to the cutter on the opposite side of the core. At points 90° from the cutter on either side of it, are placed two springs of convenient length, let into depressions in the core, one having two spurs one fourth of an inch apart and one fourth of an inch long, opposite the place designed for the croze; the other having a lip adapted to excavate the space marked by the
- 10 spurs; and on both springs a button or knob, as far below the spurs and lip as the pail extends below the bottom or croze. Place a cylinder on the core, and the core upon the tail spindle of the lathe and so
- 15 confine the cylinder by hand or otherwise to the core that it shall not turn with it. When the cylinder has passed the buttons or knobs the cutter will have turned out the inside of the cylinder and as soon as the
- 20 buttons or knobs, which have been depressed, while the cylinder was passing them, the springs extrude the spurs and lip and cut the croze, and the springs crowding on opposite sides against the cylinder
- 25 will cause it to revolve with the core, when the hand or other friction holding it against the action of the cutter on the core is removed.

- A second purpose of my invention is to
- 35 form the headings or bottoms in an improved way, and the following is my proposed method. Take any piece of board or other material of sufficient dimensions and place the center of it upon the tail spindle
- 40 and upon this other similar pieces to a height equal to the length of a cutter or saw adapted to cut the heads or bottoms into circles. In this operation all the gang of cutters are removed but one, and that one
- 45 and the tail spindle are adjusted so as to cut a circle a little larger than is required for the finished head or bottom. The lathe is started and the sliding rest is then propelled against the boards or heading, which
- 50 revolve with the pulley spindle and all are cut into circles.

- To finish the heads or bottoms, an apparatus of the following description is attached to the lathe. One part of the apparatus consists of three circular saws or two
- 55 circles with chisel-like cutters attached of any convenient diameter, say the first six inches and one fourth of an inch thick; the second four inches and to correspond in thickness to the croze cut in the cylinder; and the third like the first. In this order
- 60 the three saws or cutters are to be placed in a horizontal position and attached to the pulley spindle of the lathe to be revolved

with the swiftest speed, which the gang of 65 pulleys on that spindle will admit.

Another part of the apparatus may be compared to an arm and fore arm, with a joint between them which we will call a crane. The arm is let into a mortise in one 70 of the posts or otherwise attached to it, from which it extends in a horizontal direction of the same height and in the same plane with the saws or cutters when attached to the spindle. The mortise is to be 75 so wide as to admit the tenon on the arm to be raised or depressed to adjust it to the plane of the saws or cutters and so deep as to permit the arm to be shortened or elongated, to bring the fore arm in the desired 80 position to the saws or cutters. The fore arm is attached to the arm by a joint turning on a pivot, which will admit it to approach to or recede from the saws or cutters and in the same plane. This arm has a hori- 85 zontal slot extending from the outer end toward the joint a distance sufficient to admit the head to be finished. Two centers pass perpendicularly one through the upper and one through the lower portions of the 90 fore arm, to the slot, and the unfinished head is adjusted to the plane of the center saw or cutter. Suppose the unfinished head to be thirteen inches in diameter and is to be finished to twelve. The fore arm 95 can be moved from the saw or cutter by elongating the arm, so as to admit the head to be placed on the centers in the fore arm in the proper place. The distance of six inches from the exterior points of the teeth 100 or cutter of the center saw and the points of the centers will be the point, to which the fore arm may be borne toward the saws and there it must be stayed by some resistance which it cannot pass. This effect is 105 secured by the following described apparatus; the unfinished head or bottom being held by and turned around against the saws or cutters by hands. The lower center which passes down through the under por- 110 tion of the slot in the fore arm of the crane, is fitted into and made fast to a circular piece of iron having a smooth under surface, which will permit it to move easily on suitable support. This center is surround- 115 ed with four spurs, upon which the head or bottom is placed and forced upon the center and spurs by a screw standing directly over the lower center. The support of the circular piece of iron into which the lower center 120 is placed, we will call the tether table. If the unfinished head be now turned around, the circular piece of iron, into which the lower center is fastened will turn with the head as it is turned toward the saws or 125 cutters.

To prevent the head from approaching too near the saws or cutters, a stationary



pulley is made fast in the tether table in such a position that a band passing around the center and the stationary pulley shall permit the fore arm of the crane to approach only to the desired point. The head being now turned once around against the saws or cutters, will be finished to a perfect circle, and the upper and lower edge of the head will be fitted to the croze. If it be desired to fit the head to an elliptical form, a pin is to be placed in the circular piece of iron at a point corresponding to the desired eccentricity of the ellipse. If the tether band be now passed around the stationary pulley and the center inclosing the pin and the head be turned against the saws or cutters, the pin operating against the tether band, will retract the head from the saw or cutter to the extent of the distance between the pin and the center, which become the foci, and the ellipse would be perfect, but for the fact that the retraction is not in a right line, but forms the segment of a circle whose center is the pivot on which the fore arm turns.

The following are references to the drawings accompanying the specifications.

Fig. 1, a perspective view of the lathe ready to receive a block upon the tail spindle, to be cut into cylinders, exhibiting the cutters attached to the lower end of the pulley spindle nad those attached to the sliding rest; Fig. 2, a perspective view of the lathe, with the crane and tether table attached, with the apparatus to be used in finishing circular and elliptical heads. Fig. 3, a perspective view of the core, with which to turn out the inside of the pail or vessel to be finished.

A, A, A, A, the frame; B, B, upright posts; C, upper cross tie; D, second cross-tie; E, bottom cross-tie; F, sliding rest; *a*, tail spindle; *a*, *a*, pulley spindle; 1, 2, 3, 4,

cutting tools in sliding rest; *g*, groove for sliding rest; P, pulley; S, tether table; L, lip of sliding rest; O, arm of the crane; *p*, fore arm of the crane; O, set screw to hold the head upon the spurred center; *t*, stationary pulley; Q, circles on the pulley spindle, to which is attached the cutters to turn the heads; I, II, III, head cutters attached to the circles; V, apparatus to limit the diameter and circumference of circular or elliptical heads or bottoms; *v*, spurred center on which the head or bottom is made fast by the screw above it; *u*, pin or focal point of an ellipse; *x*, tether band; A, core with cutters attached to it, with screws passing through slots with two springs; one having two spurs to mark the croze and the other having a chisel point to cut out the space marked and both having a knob at the lower end. The spring opposite the cutter is not shown; G, the cutter to finish the inside of the pail or vessel; H, H, springs to which are attached the knobs, spurs and cutter to finish the croze; *h*, *h*, knobs; *n*, cutter; *m*, *m*, spurs to mark and cut the croze.

What I claim as my invention and desire to secure by Letters Patent is—

1. The application and use of a cutter or cutters in gangs attached to a sliding rest as described and specified or their equivalent.

2. The apparatus for forming and finishing circular or elliptical heads or bottoms as described and specified or its equivalent.

3. The apparatus for turning out the inside of the cylinders and cutting the croze as described and specified.

DAVID PIERCE.

Witnesses:

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E. JOHNSEN.