George G. Robertson,

Carving Wood.

No. 5,873. Patented Oct. 24, 1848.

Fig 1

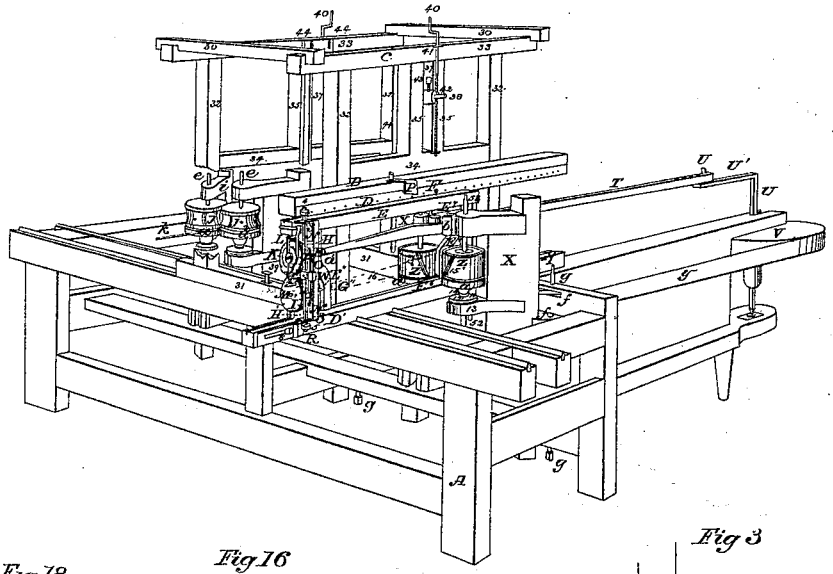


Fig 18

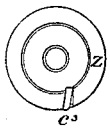


Fig 16

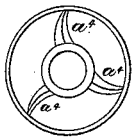


Fig 3

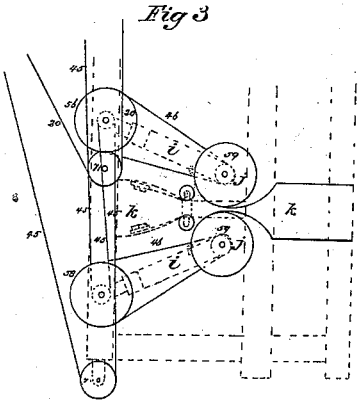
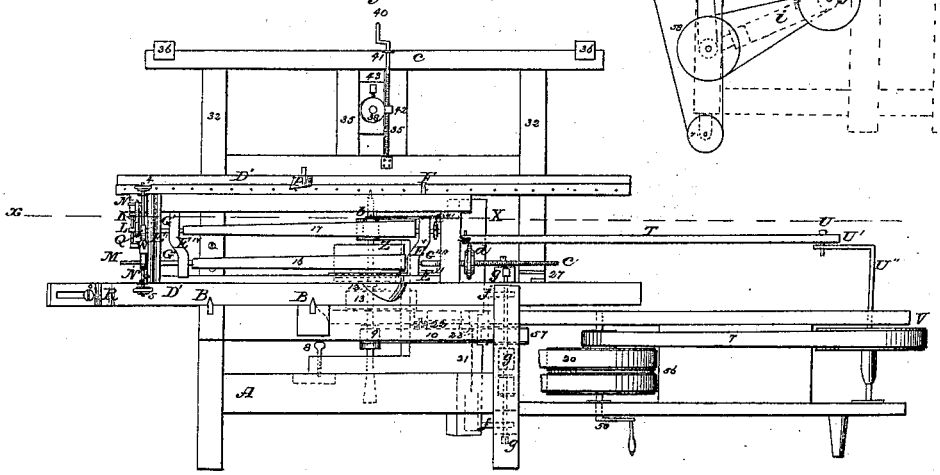


Fig 2



UNITED STATES PATENT OFFICE.

D. GEORGE AND H. ROBERTSON, OF GRANVILLE, OHIO.

CUTTING IRREGULAR FORMS.

Specification of Letters Patent No. 5,873, dated October 24, 1848.

To all whom it may concern:

Be it known that we, DAVID GEORGE and HALL ROBERTSON, of the town of Granville, in the county of Licking and State of Ohio, have invented a new and useful Machine for Shaping and Dressing Spokes and other Pieces of Wood for Making Wagons, Sleighs, Carriages, and for other Purposes, which is described as follows, reference being had to the annexed drawings of the same, making part of this specification.

Figure 1 is a perspective view of the machine as arranged for dressing spokes of carriage wheels. Fig. 2 is a side view of a portion of the machine. Fig. 3 is a horizontal section on the dotted line *x x* of Fig. 2 showing the arrangement of the pulleys, bands, &c., Fig. 16 is a top view of one of the guide wheels. Fig. 17 is a vertical section of one of the guide wheels, and one of the cutting cylinders, shafts, pulleys, and part of the swing frame. Fig. 18 is a top view of one of the cylinders for dressing articles square, and for tenoning and cutting shoulders.

Similar letters in the several figures refer to corresponding parts.

A is the frame for containing and supporting the several parts of the machine.

B B are two longitudinal angular ways, or ribs, to guide the carriage, upon which the fellies, and other articles are placed.

C is a movable transverse frame, placed upon the top of the main frame for suspending a hub and set of spokes, driven into the same, in order to cut the square tenons on the small ends of the spokes, preparatory to their being inserted into the fellies; and to which frame one of the transverse ways, hereafter described, is fastened.

D D′ are two parallel ways, between which the carriage carrying the spoke pattern and spoke to be dressed, traverses longitudinally—one of said ways (D′) being grooved in the upper side, to admit the lower side of the carriage to slide therein, and fastened upon the top of the frame—the other way (D) being fastened to the side of the upper frame C, and provided with a metallic rib or plate D″, fastened to the side of said way and projecting below the under side thereof, forming a lip or tongue to enter a corresponding groove, in the upper side of the carriage, for guiding the same as it is moved back and forth.

E is the carriage for carrying the pattern of a spoke, and a rough spoke, or piece of timber to be dressed, to a similar form to that of the pattern, and the mandrels, gearing, and appendages by which they are held and revolved, during the operation of passing them longitudinally between the guide rollers *b* and revolving cutters 15.

This carriage is composed of a longitudinal timber E and bar E‴ connected by vertical posts E′ E″ the timber E being grooved on the upper side as aforesaid. The cast iron bar E‴ runs in the aforesaid groove in the bottom way D′.

The bar E‴ is cast with a thin curved post E^{iv} of the same thickness as the bar—the upper end of said post being let into the under side of the aforesaid timber E. This post and the large post E′ are bored with round holes to admit the journals of the mandrels to turn truly therein. There is a corresponding iron post E^{v}, next the opposite end of the carriage, bored in a similar manner to admit the mandrels that sustain the opposite ends of the spoke pattern, and rough spoke or piece of timber to be dressed. This post may be moved between the fixed posts E′ E″ in order to make its position correspond with various lengths of spokes to be dressed. A notch or groove is made in its lower end, that moves back and forth over a rib E^{6}, cast on the upper side of the aforesaid cast bar. The upper end of said movable post has a horizontal bar or T head E^{7} cast on it, that slides in a groove, made in the under side of the horizontal rail E. The said T head has a female screw made in its upper edge to admit a male screw F, inserted into a corresponding hole, in the top rail or side of the carriage, by which the said T head post is held firmly; the said screw has a shoulder on it, that turns on the top of the rail E of the carriage. There are several holes made in the rail to admit said screw F to be shifted from one to another in changing the position of the post.

The mandrels G′ G″ G‴ G⁗ Fig. 2 for holding the pattern and spoke, are made like other mandrels in use. The mandrels G′ G″, are extended through the wide post E′ at the rear or left end of the carriage, far enough to receive cog wheels H, and circular notched plates I Fig. 1—the cog wheels being geared together or engaged the one with the other, and turning together with the same speed, and the notched plates turning with the cog wheels, being fastened

to them. The peripheries of the plates, however, do not touch each other.

K Fig. 1 is a spiral or coiled spring for turning the pattern and spoke, when not held fast by the levers N, N′ and dogs *n*, *n*, one end of said spring being made fast to the mandrel, and the other end to the carriage.

L is a small cross bar, inserted into the end of the mandrel outside the spiral spring for keeping the spring in its place, and also for striking against a stop (1) in the large post to determine the distance that the spring should be wound. This cross bar also strikes against another stop (2), inserted into the post, to prevent the spring unwinding beyond the required distance.

M is a crank handle for turning the cogged plates, and cogged wheels, for winding the spiral spring, preparatory to the commencement of the operation, of dressing the spokes.

N is a jointed lever and *n* dog, for holding the upper notched plate and cogged wheel from turning, while the dog is in one of the notches the fulcrum being at 3.

O is a spring for keeping the dog in gear with said plate, made as a single, or double spring. P is an inclined plane, fastened to the upper way D against which a roller (4) on the end of the jointed lever N, strikes as the carriage with the spoke, moves toward the cutters, for ungearing the dog *n*′ from the notched plate I to allow the pattern to turn by the action of the spring *k*.

N′ is another jointed lever, dog, and spring, for operating on the lower plate I′ and cog wheel, in the same manner as above described.

R is another inclined plane, attached to the lower way D′, against which an antifriction roller (5) on the lower end, of the lower jointed lever N′ strikes as the carriage runs back, for the purpose of moving said lever, and disengaging the dog from the lower plate I′, to allow the spoke to turn the required distance. This inclined plane is made adjustable, to suit various lengths of the spokes, the screw for adjusting the same being at 6.

S are right angled mortised plates, fastened to the post E′, for sustaining the jointed levers in their proper places, during the operation of the rollers passing up over the inclined planes.

W is a casting, screwed to the post E′ containing a mortise, in which the lapped ends of the levers N, N′ are placed, and through which the joint pin is inserted, and a slit into which the steel spring *o* is inserted. This spring is confined at the middle, in said block, its ends reaching over and beyond, and resting upon two protuberances, or cogs on the back of the levers.

T is the pitman rod by which the sliding carriage E is connected with the crank shaft U″. U is a pin for connecting the pitman rod and crank. The pitman rod and crank, are pierced with openings to admit the pin to be changed in position, for increasing and diminishing the sweep of the crank, according to the length of spoke required to be dressed.

V is a pulley on the crank shaft, around which is passed a band (7), leading around a small pulley on the driving shaft 50 for driving it.

X is a vertical swing frame hinged to the main frame, and made to turn in the arc of a circle, on vertical axles *g*, any convenient number of degrees of a circle; or made to stand in a fixed position by a screw 8, Fig. 2.

Z is a revolving cylinder of cutters, for shaping and dressing the spokes. This cylinder is fixed to a vertical shaft 51, Fig. 17, turning in suitable bearings in the swing frame, the lower end of said shaft being brought to a point, and stepped in an adjustable box 52 and the upper end made concave to receive the end of an adjustable screw 53. On this shaft there is a pulley (9), for a band (10), leading around a pulley on the axle of the swing frame, by which the cylinder Z is revolved. One of the central bearings of the shaft, is a small tube (11), with a horizontal circular flange (12), bolted or screwed to an arm (13), of the swing frame. Over this tube is slipped a central collar (14), of the horizontal guide wheel *a*. The horizontal guide wheel *a* (Figs. 16 and 17) is made of metal and open in the center and about $\frac{1}{16}$ larger in diameter than the cutter cylinder, having three arms a^4 a^4 a^4 Fig. 16 radiating from the hub, to the rim, made thin on top, so that the shavings shall not lodge against them, but shall pass down through them, as they descend from the interior of the cylinder Z, which is generally provided with two, three, or more cutters 15, for dressing the spoke. This guide wheel *a*, is not used when the machine is used for dressing spokes, but a guide roller *b*, is used, which is connected to the top of the swing frame, for the purpose of guiding the cylinder of cutters, over the surface of the spoke 16, placed below it, by turning itself over the surface of the pattern 17. This roller is attached to the swing frame by a metallic plate, bent at each end at right angles, and bolted to the swing frame. The oil is introduced to the point of the shaft, through a small aperture made in the side of the screw pin. The periphery of the small guide roller *b*, is arranged perpendicularly over the periphery of the cutter cylinder Z.

A corresponding swing frame X′, cylinder Z′ of cutters, guide rollers and other ap-

pendages, to those above described, are arranged on the opposite side of the carriage, for dressing the other half of the spoke, made, and arranged, and operated, in the manner just described.

During the operation of the machine, the pattern spoke moves longitudinally between the guide rollers *b*, and the spoke to be dressed, in the same direction, between the cylinders Z of cutters, which turn in contrary directions, and against the spoke. The bits 15, must be inserted in the throats of the cylinders, inclining forward a few degrees from a perpendicular, and arranged in contrary directions. The cylinders and their cutters, must be adapted in size and shape to the kind of work to be done by them. The cylinders are revolved by a band 10, passed around pulleys on their axles, and leading thence to pulleys on the axles of the swing frames, which pulleys are revolved by another band 20, passed around them, and around an extra pulley 71, Fig. 3, and the main drum 56, in the manner represented in Fig. 3—the arrows indicating the direction of the revolving of the cylinders.

Fig. 2 is a screw for turning one of the lower mandrels on which a spiral thread is cut, the end of the mandrel being square, and inserted into the end of the screw *c*.

d is a circular plate, for turning the screw.

e is a similar plate, for turning the mandrel that holds the pattern.

f f are two cast iron T-shaped hinges, the head being screwed to the back edge of the swing frame, and the shank bored with round openings, through which iron bolts (*d*) are inserted, having threads cut on them, that screw into the frame, said bolts serving the double purpose of confining the hinges, and for tightening the pulleys, having cavities in their ends, to receive the pivot ends of the axle of the pulleys as aforesaid.

h h, Fig. 2, are weights, for drawing the swing frames inward toward each other, and for keeping the guide rollers of the swing frames in contact with the patterns. These weights are appended to the ends of cords 21 attached to the swing frames, and carried over guide pulleys (22) (23), attached to the main frame, in a position that the weights will rise and fall, without striking against each other.

Operation of the machine: The machine being put in motion by steam, or other power,—the pattern 17 of the spoke or other article to be shaped, and dressed, and the rough spoke 16 to be acted on, being secured to the mandrels G′ G″ G‴ G⁗ Figs. 1 and 2; the crank U′, on the revolving shaft U″, causes the carriage E, to move back and forth, between its guides or ways—the pattern striking against the peripheries of the guide rollers *b*, causes the cylinders Z, carrying the cutting tools, to advance toward or recede from the spoke, according as a protuberance, or a depression of the pattern presents itself to the surfaces of the rollers *b*, and to cut the rough spoke 16, to the same shape as the pattern—the cutter cylinders Z, turning in the direction shown by the arrows Fig. 3, as it passes longitudinally between them, and cutting from end to end, during its forward and back movement—the pattern, and spoke, and mandrels, to which they are attached, being turned by degrees, or notches, by the spiral spring, and appendages, at the end of the carriage—so that the cylinders of cutters, shall act on the corners of the spoke, from end to end simultaneously on opposite sides, before the spoke is suffered to turn. As the carriage advances toward the driving power, and when the small end of the spoke has passed the center of the cylinder of cutters, the roller 4, on the end of lever N, strikes the inclined plane P, vibrates the lever N, contracts the spring O—disengages the cog *n*′, from the notch, in the notched plate I, and suffers the spiral spring K, to turn the plate I, a distance equal to half the length of the space between the notches, when the tooth on the lever N′, falls into a notch of the wheel I′ to which it belongs—the cog wheels H, H′, on the mandrels G′ G″ causing the plates I, I′, to move simultaneously—said cog wheels H, H′, being geared together—and the notches in the plates, being so arranged, that when a cog of one lever is in a notch, the cog of the other lever is bearing against the blank, between the notches of the other plate. In this manner the operation is continued, until the spoke is dressed, to a similar size, and shape, to that of the pattern. The chips passings down through the hollow of the cylinder Z, between the arms of the guide wheels *a*,—and when the spiral spring is unwound, it is again wound, by turning the crank handle M until it strikes the stop 1.

The bends in the posts E′ E″ bring the ends of the spokes into such position that the pattern will pass between the rollers *b* before the end of the spoke is met by the cutters.

When short spokes are required to be dressed, the curved posts and mandrels, are brought nearer together and the sweep or movement of the carriage diminished by changing the position of the pin U, that connects the pitman rod T to the crank U′.

We do not claim shaping and dressing pieces of wood by means of patterns hung on centers and revolving on their axes, simultaneously with the revolving of the block of wood to be cut, shaped, or dressed, as this has already been patented; but

What we do claim as our invention and desire to secure by Letters Patent is—

The combination and arrangement of the

mechanical devices, above described, attached to the reciprocating carriage E for turning the pattern and piece of wood to be shaped simultaneously, a segment of a circle, at the end of each reciprocating movement of the carriage, with the cutters 15—15 contained in the revolving cylinders z, z', arranged in the vertical swing frames x x' attached to the main frame A, by which the spoke, or other article to be shaped, will be dressed to a form approximating to that of the pattern as above described.

In testimony whereof we have hereunto signed our names before two subscribing witnesses, this sixth day of August 1847.

DAVID GEORGE.
HALL ROBERTSON.

Witnesses:
SAMUEL BANCROFT,
EDWIN SINNET.