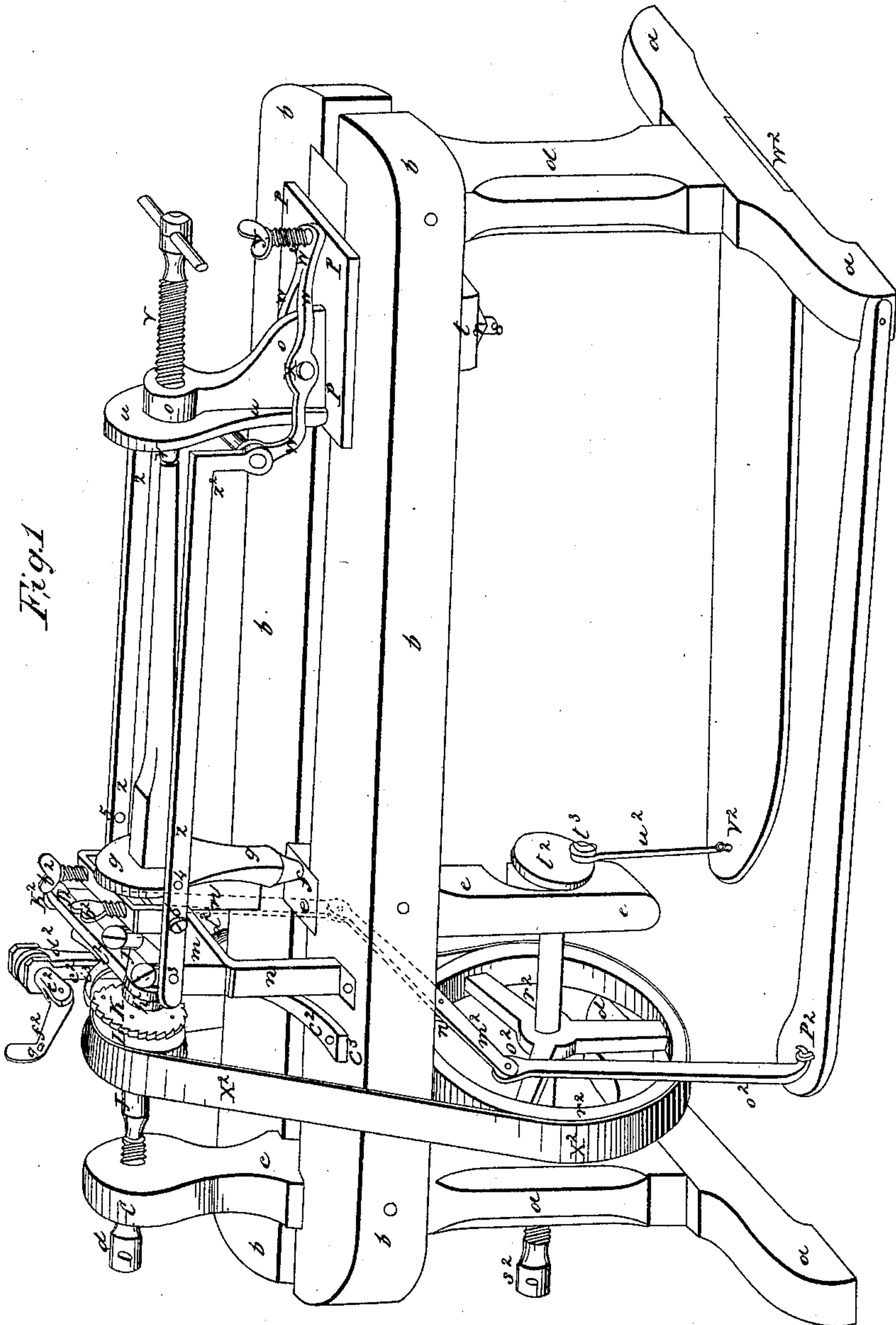


Sheet 1-2 Sheets.

*E. Julier,*  
*Spoke Lathe.*

*Nº 16,121.*

*Patented Nov. 25, 1856.*

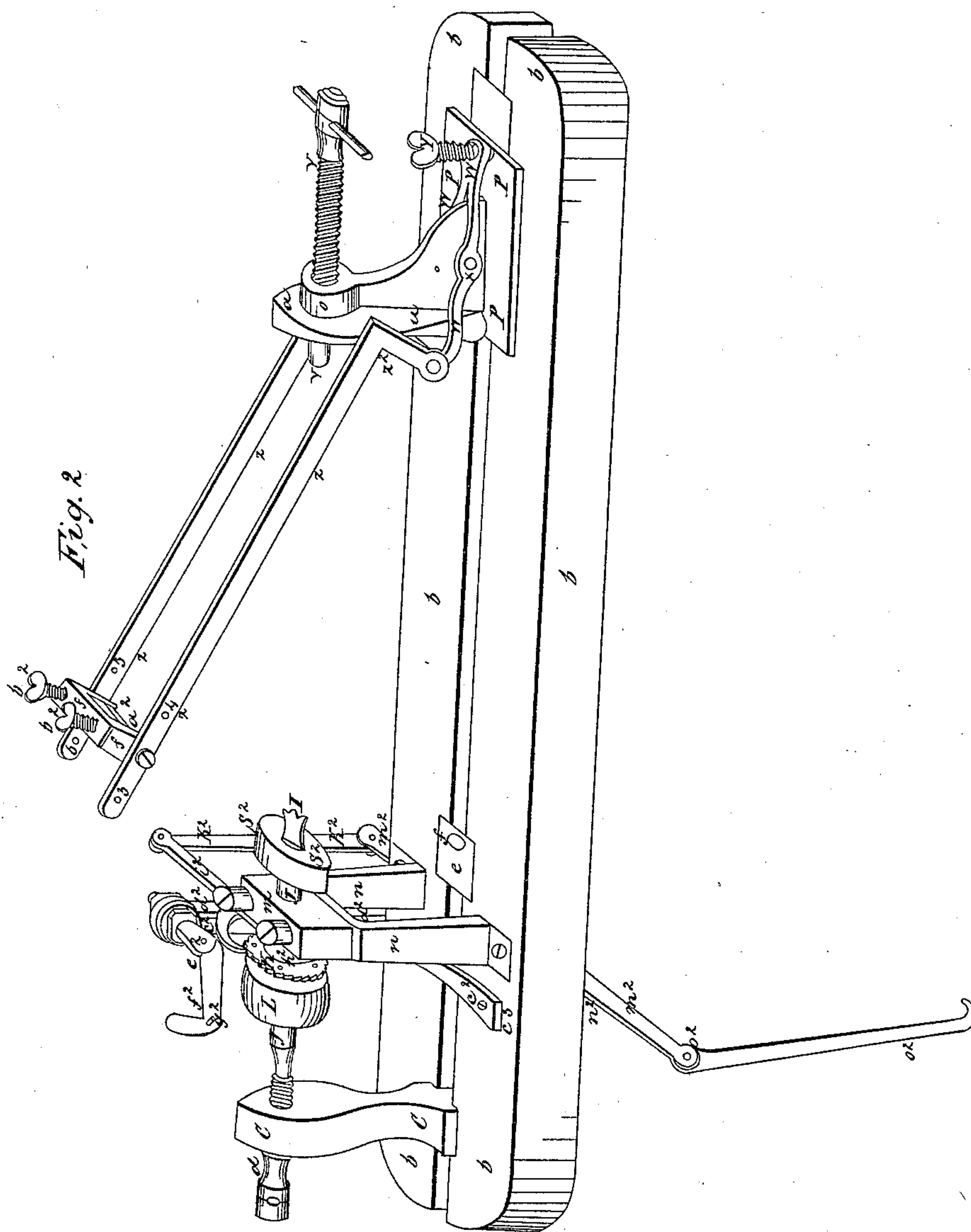


Sheet 2 of 2 Sheets.

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# UNITED STATES PATENT OFFICE.

EDWD. JULIER, OF SHARON, OHIO.

## MACHINE TO AID IN MAKING SPOKES BY HAND.

Specification of Letters Patent No. 16,121, dated November 25, 1856.

*To all whom it may concern:*

Be it known that I, EDWARD JULIER, of Sharon, in the county of Noble and State of Ohio, have invented and made certain new and useful Improvements in Machines for Forming Spokes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1, is a perspective view of the machine, in all its parts complete. Fig. 2, is also a perspective view of the upper portion of the machine. Fig. 3, is one of the knife shields detached from the machine. Fig. 4, shows a parallelogramic piece of timber from which the spoke complete is to be formed.

The construction of my improvements is as follows. I employ a superstructure formed of two pedestal legs,  $a, a, a, a, a, a$ , upon which is surmounted two longitudinal timbers or beams or shares arranged parallel to each other, about three inches apart, and confined together by bolts and screws, or in any suitable manner; thus forming in appearance, a lathe framing, as at  $b, b, b, b, b, b$ . The share part pieces  $b, b, b$ , may be from  $5\frac{1}{2}$  to 6 feet long by 4 inches square. One of the pedestal legs, continues or extends upward above the timbers or shares about 8 inches as at  $C, C$ ; through this head part passes a suitable set screw  $d$ . Pendent from the underside of the shares or beams  $b, b, b$ , is a hanger or journal support  $e, e, e$ , the upper end of which has an indentation, or shallow bore or mortise  $f$ , in which is inserted the end of a vertical or upright piece of wood 8 inches long of the form shown at Fig. 3, and at  $g, g$ , Fig. 1. This piece I term a buffer head or knife shield, and through it toward its upper end is a suitable mortise or circular opening, to admit of the revolving therein, and its extending through, of a spur or notched chuck  $i$ , Fig. 2, used on the end of the mandrel,  $J, J$ , Figs. 1, 2, to which mandrel is attached, permanently a suitable sized, ratchet  $K$ , and a small band pulley  $L$ . The mandrel is supported by a suitable journal box or bearing  $m$ , mounted on a straddle standard or head  $n$ , Figs. 1, 2. Toward the right hand end of the beams or shares is a suitable tail block  $o, o$ , of metal, formed with a base plate  $P, P, P$ , and attached to the upper face of the shares,

by a screw bolt, and tap  $r, s$ , and a keep block  $t$  Fig. 1. Immediately in front of the tail block is another buffer, head or knife shield  $u, u$  Figs. 1, 2, arranged about 3 feet from the left hand one  $g, g$ , or sufficiently far apart to take in the spoke timber.

Through the tail block and buffer head, passes an adjusting set screw  $v, v$ , Figs. 1, 2. To the tail block, near its base is attached a device, which I term a straddle, fork, or adjustable gage  $w, w, w, w$ , attached to the sides of the tail block by an axis bolt and head  $x$ , and at its end formed with a female screw, in which works an adjusting screw  $y$ , Figs. 1, 2. To the forked ends of this adjustable gage, is hinged a device formed of two thin metallic rods or bars  $z, z$ , with elbows  $z^2$  and to the straight or front ends thereof is attached a yoke device  $\&, \&$ , with a gage plate  $a^2, a^2$ , and adjusting screws  $b^2, b^2$  Figs. 1, 2. These rods or bars have one or more sets of holes, 3, 4, 5, 6, intended for the adjustment of the yokes  $\&, \&$ , outwardly or inwardly. This device I term the forming gage.

To the top of the beams or shares in a line ranging between the pulley and ratchet  $K, L$ , is a stand brace piece of metal  $C^2, C^2$ , of suitable size, having a foot part  $C^3$  screwed to the front beam, and bent, or inclined across the back beam, outwardly, from the band pulley, and continuing upwardly sufficiently high, say from 9 to 10 inches, terminating in an eye part and connected to an upright rod  $d^2, d^2$  bolted on to the back part of the back share or beam, Figs. 1, 2 at the point of connection of these two pieces of metal are holes or perforations through which passes a screw bolt having an elongated, and split or slotted head as at  $e^2$ , in which is riveted to work on a joint a knuckle, a dog  $f^2$  having a stop pin  $g^2$ , Figs. 1, 2; next to the ratchet wheel, on its right side, and around the mandrel of the machine, is a collar or ring  $h^2$  with an extension or shank part  $i^2$  hinged or jointed at  $J^2$  on to a vertical rod  $k^2, k^2$ , which rod is hinged on to a lever  $m^2, m^2$ , which is hung or suspended on a fulcrum  $n^2$ , Figs. 1, 2, attached to the underside of the front share or beam of the machine, and to the end of this lever is hinged or jointed a pitman connection  $o^2, o^2$ , Figs. 1, 2, and to which pitman rod or connection is hooked a pedal  $P^2, P^2$ , Fig. 1, bolted to the right



hand base beam of the leg or pedestal at  $q^2$ , by a screw or bolt so as to admit of the pedal working freely.

Between the journal hanger  $e, e$ , and the left hand pedestal is employed a suitable band wheel  $r^2, r^2$ , the ends of whose axle are supported by the hanger  $e, e$ , and by the journal set screws  $s^2$ , Fig. 1. To the inner extremity of the axle is a crank disk or arm  $t^2, t^3$ , Fig. 1, to which is attached a crank rod or pitman  $w^2$ , connected to a treadle  $v^2$ , hinged at  $w^2$ , to the underside of the right hand pedestal, Fig. 1.

The nature and operation of my improvements I will proceed to describe. In interior regions of country, where wheelwrights have rather a limited amount of work which will not justify the erection and employment of complicated and costly automatic machinery to produce spokes cheaply and rapidly, and where spokes can not be made except by persons of considerable skill and experience, it has long been a desired object to have recourse to some means or mode of overcoming such difficulties, and many mechanical devices have been from time to time produced, but such devices have as yet been found very limited in their advantages, and after many years of practical experience and test I have at length been enabled to produce a machine answering in every respect the desired purpose of simplicity, cheapness of construction, and general utility, and thus enabling the manufacturer, of limited means, and business, to have the advantage of a most useful machine, costing to make it not over fifteen dollars, and being convenient, portable, and readily put in operation. By the aid of my machine an apprentice, or ordinary skilful workman, can complete a full, perfectly formed and accurate set of 52 spokes in the very short space of four hours.

The operation of my machine is as follows, viz: A roughly hewn piece of wood is attached to the chuck  $i$  Fig. 2, which extends and revolves through the shield or buffer  $g, g$ , and the other end held by the center screw mandrel  $v, v$ , passing through the tail block and  $o, o$ , and buffer  $u, u$ . The pawl or detent device  $i^3$  is temporarily thrown off the ratchet wheel  $k$ , so as to admit of the stop or dog  $f^2$  being brought down, and its pin  $g^2$ , inserted into one of the holes in the ratchet wheel  $k$ . This being done, the operator stands in between the pedal  $P^2$ , and the machine; the left foot resting on the pedal  $P^2$ , the operator takes an ordinary drawing knife, in his hands, and adjusting the forming gage  $z, z^2—z, z^2$ , in position, he rests the blade of the knife, on the piece of wood, and standing with the face toward the left hand end of the machine, the shaving of the rough timber is proceeded with, while the knife can not,

when resting on the forming gage or rests  $z, z^2—z, z^2$ , penetrate the wood below their upper lines. Thus one side or square face is formed; then the dog or stop  $f^2$ , is pushed out of the ratchet, and at the same time the left foot of the operator depresses the pedal which causes the mandrel to revolve one-fourth of its circumference, when the dog or stop is inserted into a second hole of the ratchet; and a second side or square surface is formed in a similar manner with the draw knife, thus the rough timber is squared. The square formation being gaged by the four holes in the ratchet wheel formed at equal distances apart. After the rough timber is squared, the dog or stop  $f^2, g^2$ , is thrown upward and off from the ratchet. This being done next the spoke is formed, by attaching over and on to the notched chuck  $i$ , a forming cam device  $s^2, s^2$ , Fig. 2. The forming gage  $z, z^2$ , being thrown down horizontally while the yoke device  $\&, \&$ , with its gage plate  $a^2, a^2$ , rest on the forming cam Fig. 2. The operation of shaving is proceeded with then taking off the sharp edges, and forming the spoke, by treading down or pressing the pedal  $P^2$ , which being connected to the pitman  $o^2$ , and lever  $m^2$ , and their rod connection  $k^2, k^2$ , the detent or pawl, pushes the ratchet, around, which also causes the forming cam  $s^2, s^2$  to turn and in so turning; it causes the mandrel or chuck to move or rotate the spoke. In the rotation of the forming cam, it elevates or depresses, and in so doing, the forming gage, or knife rest  $z, z^2$ , elevates and depresses, in a corresponding manner, so as to vary the cut or stroke of the knife and whereby the shape of the spoke must be exactly of the same shape of the forming cam  $s^2, s^2$ , Fig. 2. Thus any form of spoke may be produced, by employing cam forming devices, and attaching them to the end of the mandrel as at  $s^2, s^2$  Fig. 2.

If the butt end of the spoke is to be made thicker and heavy, all that is required is to screw in the set screws  $b^2, b^2$ , when the gage plate  $a^2, a^2$  descends, against the forming cam  $s^2$ , which throws upward or elevates the forming gage or rest device  $z, z^2$ . Then again if the smaller end of the spoke is also to be increased in proportion the set screw  $y$  is screwed in, which depresses the end  $w^2$ , while the forked ends  $w^3$  are thereby raised, and which being hinged or jointed on to the forming gage or knife rests  $z, z^2$ , elevates the elbow ends  $z^2$ . In Fig. 1, the spoke is shown in the position for being formed. The operator can revolve the spoke at will by the action solely of the left foot, more or less at pleasure.

After the spoke is shaped by the knife, the forming gage or knife rest is thrown upward and back, as in Fig. 2, so as to ad-



mit of filing and finishing by sand paper, for which purpose the treadle  $v^2$ , is employed and set in motion by the action of either foot of the operator, the band or belt  $x^2$ ,  $x^2$  being thrown or adjusted over the wheels  $R^2$  and  $L$  the pawl or indent  $I^3$  is thrown off the ratchet, and the machine thereby being converted into a turning or finishing lathe.

10 The nature of my machine is such that not only spokes, but cylindrical, tapering, octagonal, fluted triangular, and oval forms can be produced, by aid of a convex or straight shaped ordinary drawing-knife. It  
15 will be observed also, that a most marked and new feature of operation of my machine, is in the dispensing entirely with the use and application of calipers, measuring devices, or other gage devices as well as en-  
20 tirely dispensing with comparison measurements of size and shape.

It may be well enough to remark, that the long parts  $z$ ,  $z$ , of the forming gage may be hinged to the elbow parts  $z^2$ , and to  
25 the yoke  $\&$ ,  $\&$ , in such a way as to admit of the said parts  $z$ ,  $z$ , turning outward so as to

enable the forming of the bulge or swell sometimes formed on such spokes as carriage spokes or for lighter vehicles.

Having described the construction, nature 30 and operation of my improvements, what I claim as of my own invention as new and useful, and desire to have secured by Letters Patent of the United States, is—

1. The construction and arrangement of 35 the pattern cam-gage device,  $s^2$ ,  $s^2$ , the jointed lever device  $m^2$ ,  $m^2$ ,  $k^2$  the collar shank  $f^2$ ,  $h^2$ , and spring pawl  $i^2$ , when operated by the pedal  $P^2$  or its equivalent, together and with the stop or dog  $f^2$ ,  $g^2$ , 40 and ratchet  $k$ , in the manner substantially as described, or in any equivalent manner.

2. I also claim the graduating straddle gage  $w$   $w$   $w$   $w^2$ , and hinged or jointed, forming gage rest  $z$   $z^2$ , with the graduating 45 set plate and yoke devices  $a^2$ ,  $b^2$ ,  $\&$ , with the knife shields or buffer heads  $g$ ,  $g$ ,  $u$ ,  $u$ , Figs. 1, 2, substantially as described and shown.

EDWARD JULIER.

Witnesses:

JOHN S. HOLLINGSHEAD,  
JAMES TOWLES.