(No Model.)

2 Sheets—Sheet 1.

J. J. KRAUS.

MORTISING MACHINE.

No. 306,404. Patented Oct. 14, 1884.

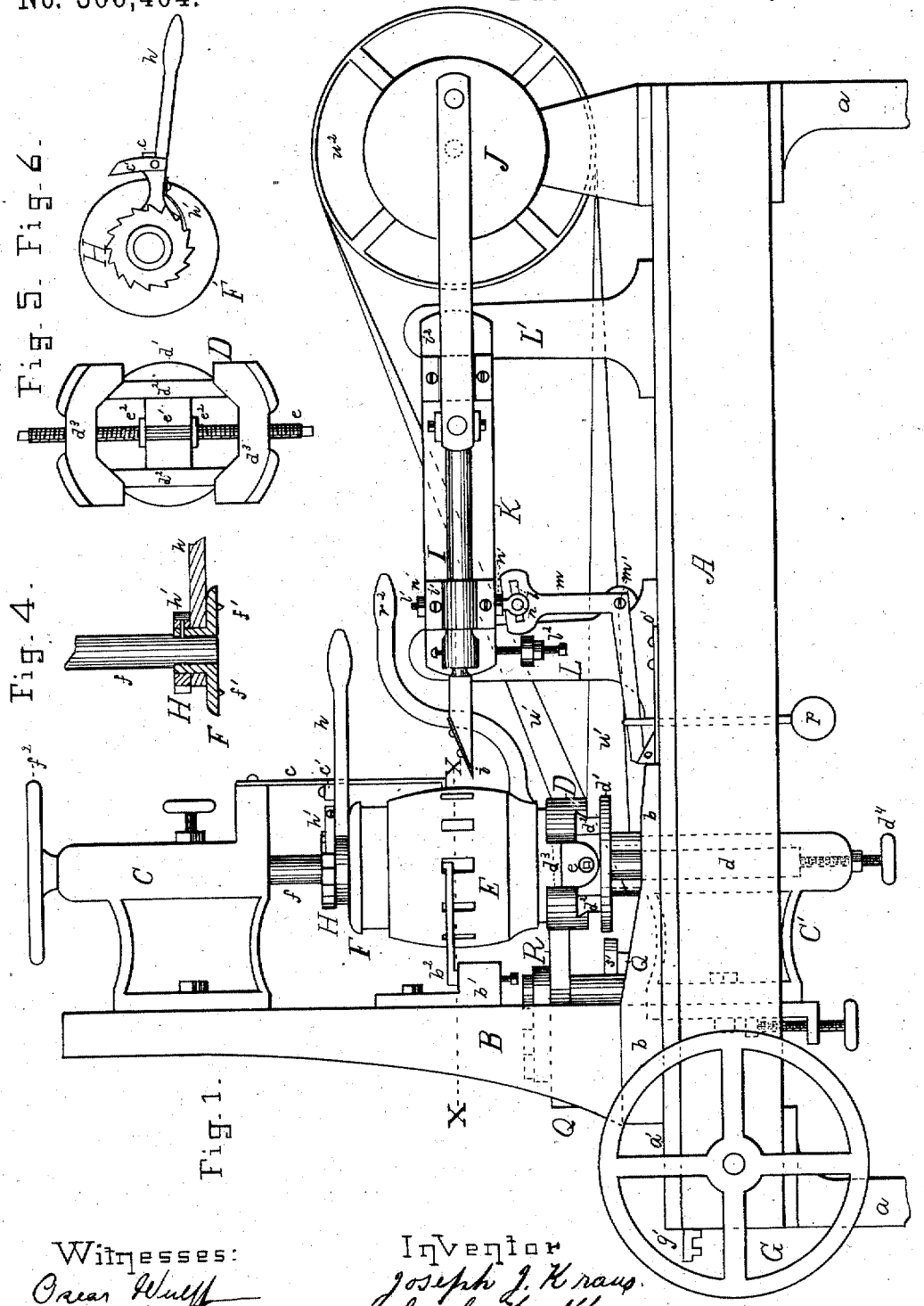

Fig. 5. Fig. 6.

Fig. 4.

Fig. 1.

Witnesses:
Oscar Wulff
John A. Bryan

Inventor
Joseph J. Kraus.
by G. H. Abbe.
his Atty.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 7.

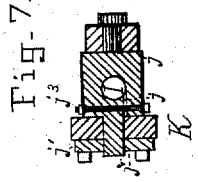


Fig. 4.

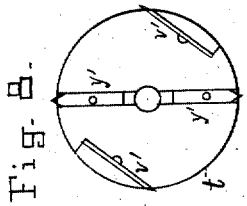


Fig. 3.

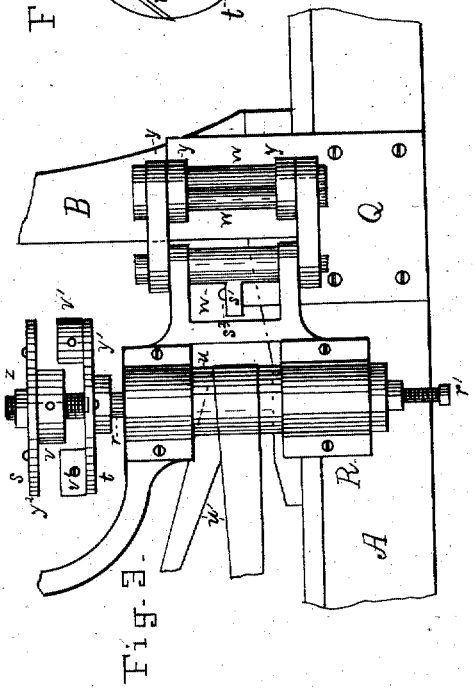
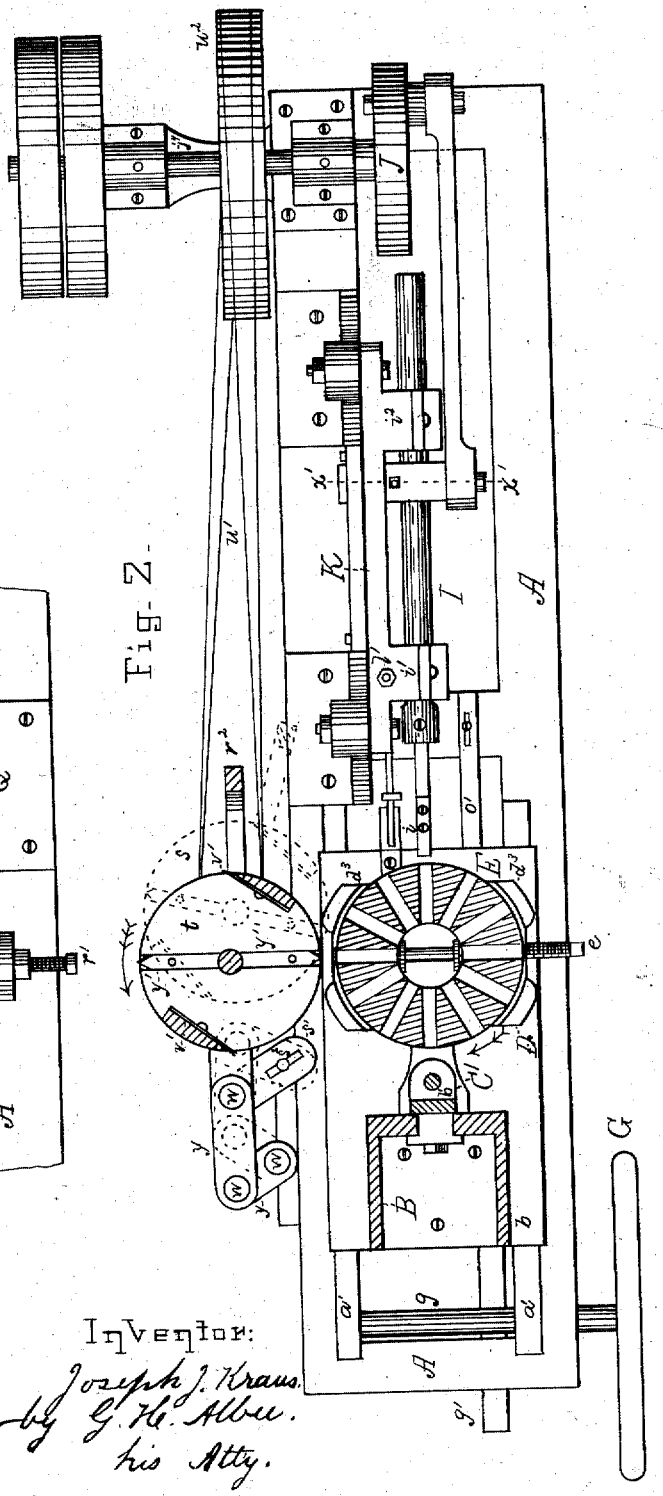


Fig. 2.



Witnesses:

Oscar Huff

John A. Bryan

Inventor:

Joseph J. Kraus.

by G. H. Albee.

his Atty.

UNITED STATES PATENT OFFICE.

JOSEPH J. KRAUS, OF PITTSVILLE, WISCONSIN.

MORTISING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 306,404, dated October 14, 1884.

Application filed March 8, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH J. KRAUS, a citizen of the United States, residing at Pittsville, in the county of Wood and State of Wisconsin, have invented a new and useful Improvement in Machines for Remortising and Finishing Carriage-Hubs, of which the following is a specification.

My invention relates to improvements in remortising and finishing the outer surface of wood carriage-hubs around said mortises after they have become thoroughly seasoned, they being manufactured from logs of the proper diameter and required length for the hub desired by being first bored for the insertion of the axle, their outer surface then turned to the size desired, then bored and mortised for the reception of the spokes, after which they are steamed and dried. It is well known that the two latter processes materially change their form and size and the size of their mortises one from the other.

My invention consists of mechanism for the manufacture of hubs having their mortises for the reception of spokes of uniform width, one end thereof being formed at such uniform angle with the face or outward end of the hub that upon the insertion of spokes therein a uniform dish of the wheel of the desired amount will be produced.

It also consists of mechanism for forming seats around said mortises, against which the shoulders of the spoke-tenons abut and form close-fitting joints therewith; and the objects of my improvements are to produce wheels superior in strength, beauty of finish, and wearing qualities. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of the entire machine. Fig. 2 is a plan of the same below the line *x x*, Fig. 1, the parts cut by said line being in section. Fig. 3 is an elevation of the rotary cutting mechanism as viewed from the rear of Figs. 1 and 2 in its application to the frame. Fig. 4 is a vertical section of the clamping-plate under which the hubs are retained for the action thereon of the cutting-tools, and the ratchet-wheel and lever for revolving the same, and showing the manner of their application to the spindle *f*. Fig. 5 is a plan of the chuck in which the hubs are placed and secured, and in which they are revolved for the operation of the cutters thereon. Fig. 6 is a plan of the clamping-plate, ratchet-wheel, and lever, (referred to in Fig. 4,) and the wedge-shaped lug *c'*, attached to the latter, for acting upon the spring *c*, Fig. 1, as will be hereinafter explained. Fig. 7 is a vertical section of the connection-pin block, and the parts in connection with it, upon the line *x' x'* of Fig. 2; and Fig. 8 is a plan of the lower flange or plate forming the cutter-head.

Similar letters of reference indicate corresponding parts in the several views.

A represents the frame of the machine, supported upon the legs *a a*, secured to it, and which is preferably made of cast-iron, to which is attached the mechanism composing this invention.

B is a standard having a base, *b*, and resting upon the ways *a'*, said ways being formed upon the surface of the frame A.

C C' are brackets attached to the standard B by bolts, and adjustable thereon.

D is a hub-chuck supported and revolving freely upon its shaft *d* in the bracket C'. Upon the upper extremity of said shaft is the plate *d'* and ways d^2, said ways being at right angles with the vertical plane of the shaft *d*,

e is a screw-shaft revoluble in the bearing *e'*, and prevented from longitudinal movement therein by collars e^2. A portion of said shaft has formed upon one extremity a right-hand and upon the opposite extremity a left-hand thread of similar pitch.

Sliding upon ways d^2 are jaws d^3, having corresponding threads engaging with it, and are simultaneously and equally moved to and from each other upon the ways d^2 by its revolution produced by a wrench in the hands of the operator and applied to either end thereof. Above said chuck in the bracket C and in axial line therewith is the spindle *f*, having vertical movement in said bracket, its revolution therein being prevented by a spline and feather.

F is a plate having a hub bored to fit loosely the lower extremity of said spindle, and upon which is fitted the lever *h* and the ratchet-wheel H, the latter being secured to the hub

aforesaid by the set-screw h', extending through said hub and into a groove in the lower extremity of the spindle f, allowing the free revolution of said plate, the lever, and ratchet-wheel, but retaining them securely upon the spindle f, as shown in Fig. 4. In the lower face of the plate F are spurs f', which enter the upper end of the hub E and retain it firmly in its position upon the chuck D, said plate being forced down upon the hub by the action of a screw engaging with the upper extremity of the spindle f and operated by the hand-wheel f^2.

G is a hand-wheel secured to the extremity of the shaft g, said shaft passing transversely through the frame A, and having secured to it a pinion which engages with the teeth of the rack g', said rack being attached to the base b of the standard B. The revolution of the wheel G by the operator causes the standard B and its attachments to be moved upon the ways a', as required, for advancing to the cutting-tools and removing therefrom the hub E, contained in the chuck D. The ratchet-wheel H is secured to the upper extremity of the hub of the plate F and revolves with it, below which and fitting loosely thereon is the hand-lever h, its backward movement thereon being limited by the spring c, and its forward movement causing the engagement of the spring-ratchet h' with the teeth of wheel H, revolving it, the plate F and hub E. Secured to the bracket C is a spring, c, its lower extremity bent into a horizontal position, and in its normal position entering a mortise of the hub E.

c' is a wedge-shaped lug adjustably attached to the lever h, which upon the engagement of its angular point with the spring c, as the lever h is oscillated to its backward limit, disengages the spring c from its mortise and retains it thus during a portion of the forward movement of said lever, and presenting the lower extremity of the spring for entrance into the approaching mortise as the hub is revolved in the direction of the arrow.

K is a bar fulcrumed upon a pin in the standard L', and having means for the vertical adjustment of said pin, the opposite end of the aforesaid bar having also means for its vertical movement upon the standard L.

Upon the bar K are bearings i' i^2, through which is reciprocated, by the revolutions of the crank-wheel J, the rod I, said rod having secured in one extremity thereof the mortising-tool i. By means of the vertical adjustment of the ends of the bar K the angle at which the mortising-tool i is presented to the hub may be varied as required for producing the required dish to the wheel.

The connection-pin block j, Fig. 7, is formed from a single piece of steel bored for the reception of the rod I, and a slot, j^2, cut through it from said bore to its outer surface, a bolt, j^3, clamping the part thus slotted tightly upon the rod I. Upon loosening the bolt j^3 the rod I may be revolved therein, as required, and also moved longitudinally for the purpose of adjusting the mortising-tool i in its relation to the hub being operated upon. Said block j also serves as a guide for the reciprocating rod I, its rear portion being extended and sliding in a slot through the bar K and between the guides j', adjustable upon and secured to said bar.

Attached to the base b of the sliding standard B is a wedge-formed piece, o.

m is a bell-crank lever fulcrumed upon the bolt m', the outward extremity of its horizontal arm engaging with the wedge-piece o as the standard B is brought forward to the position required for the action of the mortising-tool i upon the hub E. In the upper extremity of its vertical arm is a slot, l, formed at an angle therewith, and inclining toward the outward extremity of its horizontal arm.

Passing through the bar K is the spade-handle bolt l', having check-nuts n' n' for its vertical adjustment therein, its lower extremity being connected to the slot l by a pin, n.

Connected to the horizontal arm of the lever m, near its extremity, is a weight, p, its effect being to depress said arm and elevate that extremity of the bar K in connection with said lever, and also the mortising-tool i, to its highest limit. As the sliding standard B is moved into the required position for action upon the hub of the mortising-tool, the gage o' limiting said movement, the extremity of the horizontal arm is raised by the wedge o, thus bringing said tool to its lowest limit, said limit being accurately governed by the screw and check-nut l^2, and thereby gradually bringing the cutting-tool i to its lowest limit within the mortise, and forming their ends at the angle with their face or lower end of the hub required to produce the desired dish to the wheel.

In the rear of the hub E and secured to the standard B is a bracket, b', having a socket in which is the oscillating gage b^2, said gage being adjustable vertically therein by means of a screw in the lower extremity of said socket. The outward extremity of the gage is bent to the form required for its entrance into and engagement with the upper end of a mortise, thereby gaging its height relative to the mortising-tool, that they may be formed alike in the hubs one with another for the reception of spoke-tenons of a uniform width. The hubs are adjusted vertically, as required, for this purpose by the hand-wheel d^4.

Q, Figs. 1 and 2, is a plate having ears projecting from its face. R is a frame having journals therein, in which is supported and revolved the shaft r. Said shaft has near its upper extremity the cutter-head flanges s t, and fitting the space between its bearings the pulley u, which is secured thereto by a set-screw, and serves as a collar for preventing the shaft from vertical movement consequent upon the action of the belt u', by which it is revolved from the pulley u^2 upon the crank-

shaft j^4. Upon loosening said screw the shaft and the cutter-heads are adjusted vertically by means of the set-screw r'.

The frame R is connected with the ears of the plate Q by links y and pins w, and permits the position of the cutter-head to be changed from a right angle with the vertical plane of motion of the mortising-tool to that shown in dotted lines, for the purpose of its application to hubs having any number of mortises not divisible by four, and also permits a change in the position of the connecting-pin w, by which the frame R is connected to the link y, whereby the tension of its driving-belt u' will keep the cutters from contact with the hub E until their action is desired, when a slight pull by the operator upon the handle r^2 brings them to it for their action in the formation of spoke-seats upon the outer surface of the mortises. The pivotal point of the frame—the pin w—is retained in the position required by the slotted sleeve-link s', journaled upon it, and secured to the plate Q by a bolt, s^2. The advancement of the cutter-head toward the hub is limited to its required diameter by a set-screw between the lower part of frames A and Q.

Cutter-heads constructed in various methods can be used for the formation of spoke-seats upon the hubs, but one formed as described is preferred as being more quickly and accurately adapted to the required width of spoke. It is formed of two plates or flanges having, upon one side of each, ears to which are secured cutters v v', and having also grooves in which are secured the side cutters, y' y^2. Said flanges are secured to the shaft, as shown in Fig. 3, the lower one in a fixed position and the other one adjustable by means of nuts z.

The cutter-flanges s and t are so formed and secured to their shaft that the outer edges of the cutters v of the plate s will overlap those of v' in the plate t, whereby the width of cut which they make can be varied from near the width of the cutters v or v' to that of their combined width.

The operation of the several parts is as follows: The different parts being adjusted for the length and diameter of hub, the width of mortise, their number and angle of their ends for the dish required, and the width of the spoke-seats, a hub is placed upon the ways d^2 or the lower surface of the jaws d^3, as its size requires, and upon its face or outward end, and having the lower extremity of the spring c entering a mortise. It is secured upon the chuck by turning the screw e and clamping it within the jaws d^3. By turning the hand-wheel f^2 it is firmly held therein for the operation of the cutting-tools. It is then advanced to the mortising-tool by revolving the hand-wheel G, the mortise formed, the rotary cutters advanced, and spoke-seat formed, the cutter-head returning to its non-cutting position by the tension of its belt. The standard B is then receded from the mortising-tool, the hub revolved until the spring enters the adjoining mortise, and the operation repeated until all are brought to the cutting-tools for action thereon, when the hub is removed, another inserted, and the operation continued, as described.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a machine for remortising carriage-hubs, a sliding standard, with means, substantially as described, for its movement in a horizontal direction, and having a chuck with jaws adapted to center and secure a hub therein in a vertical position, and having in axial line therewith a clamping-disk, both chuck and disk being vertically adjustable and adapted to rotate substantially as described, the disk having a ratchet-wheel and pawl and a lever for its rotation, and, in combination, a cylindrical mortising-tool holder and bearings in which it is reciprocated, said bearings being vertically adjustable upon standards to which they are connected, whereby the angle at which the mortises are formed in the hub will produce the required dish to the wheel, substantially as set forth.

2. In a machine for remortising carriage-hubs, a sliding standard, with means, substantially as described, for its movement in a horizontal direction, and having a chuck with jaws adapted to center and secure a hub therein in a vertical position, and having in axial line therewith a clamping-disk, both chuck and disk being vertically adjustable and adapted to rotate substantially as described, the disk having a ratchet-wheel and pawl and a lever for its rotation, a spring secured above the lever and limiting its backward movement, the lower extremity of the spring in its normal position entering a mortise of the hub, a lug upon the lever engaging with the spring near the limit of its backward movement, releasing it from the mortise and retaining it thus during a sufficient portion of the forward rotary motion of the hub to prevent its return to said mortise, and, in combination, a cylindrical mortising-tool holder and bearings in which it is reciprocated, said bearings being vertically adjustable upon standards to which they are connected, whereby the angle at which the mortises are formed in the hub will produce the required dish to the wheel, substantially as described.

3. In a machine for remortising carriage-hubs, a sliding standard, with means, substantially as described, for its movement in a horizontal direction, and having a chuck with jaws adapted to center and secure a hub therein in a vertical position, and having in axial line therewith a clamping-disk, both chuck and disk being vertically adjustable and adapted to rotate substantially as described, the disk having a ratchet-wheel and pawl and a lever for its rotation, and, in combination, a

cylindrical mortising-tool holder and bearings in which it is reciprocated, said bearings being vertically adjustable upon standards to which they are connected, whereby the angle at which the mortises are formed in the hub will produce the required dish to the wheel, said angle having a gradual and definite increase produced by the advancing movement toward the mortising-tool carried by said holder of the standard aforesaid, substantially as shown and set forth.

4. In a machine for remortising carriage-hubs, a sliding standard, with means, substantially as described, for its movement in a horizontal direction, and having a chuck with jaws adapted to center and secure a hub therein in a vertical position, and having in axial line therewith a clamping disk, both chuck and disk being vertically adjustable and adapted to rotate substantially as set forth, the disk having a ratchet-wheel and pawl and a lever for its rotation, and, in combination, a cylindrical mortising-tool holder and bearings in which it is reciprocated, said bearings being vertically adjustable upon standards to which they are connected, whereby the angle at which the mortises are formed in the hub will produce the required dish to the wheel, and also, in combination, a cutter-head secured upon a vertical shaft, and adjustable vertically for its adaptation to the hub-mortises, and in its normal position not in contact with them, but adapted to be advanced to and receded from each hub-mortise in a plane at right angles to the longitude of the hub, substantially as described.

5. In a machine for remortising carriage-hubs, a sliding standard, with means, substantially as described, for its movement in a horizontal direction, and having a chuck with jaws adapted to center and secure a hub therein in a vertical position, and having in axial line therewith a clamping-disk, both chuck and disk being vertically adjustable and adapted to rotate substantially as set forth, the disk having a ratchet-wheel and pawl and a lever for its rotation, and, in combination, a cylindrical mortising-tool holder and bearings in which it is reciprocated, said bearings being vertically adjustable upon standards to which they are connected, whereby the angle at which the mortises are formed in the hub will produce the required dish to the wheel, and also, in combination, a cutter-head formed of two disks or flanges, *s* *t*, one, as *t*, secured to a shaft in a fixed position, the other, *s*, adjustable thereon, each having similar cutters, *v* and *y*, upon their adjacent sides, the former having grooves, the latter the shoulders thereof, the outer edge of the grooving-cutters of one disk overlapping those of the other when placed in position upon their shaft, whereby the width of cut produced thereby may be adjusted for various width of spokes, substantially as shown and set forth.

6. A cylindrical mortising-tool holder and bearings in which it is reciprocated, and, in combination, a clamp secured thereon by compression, in which said tool-holder may be adjusted in a rotary or longitudinal direction, said clamp having a connection-pin for its connection to the crank-shaft, and also having adjustable guiding-ways within which it is guided and reciprocated, substantially as shown and set forth.

JOSEPH J. KRAUS.

Witnesses:
ORIN GREY,
B. H. TARBOX.

Corrections in Letters Patent No. 306,404.

It is hereby certified that in Letters Patent No. 306,404, granted October 14, 1884, upon the application of Joseph J. Kraus, of Pittsville, Wisconsin, for an inprovement in "Mortising-Machines," an error appears in the printed specification requiring the following correction, viz: In the lines 58–59, page 4, the word "having" should read *forming;* and that the Letters Patent should be read with this correction therein to make it conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 4th day of November, A. D. 1884.

[SEAL.]

M. L. JOSLYN,
Acting Secretary of the Interior.

Countersigned:

H. H. BATES,
Acting Commissioner of Patents.