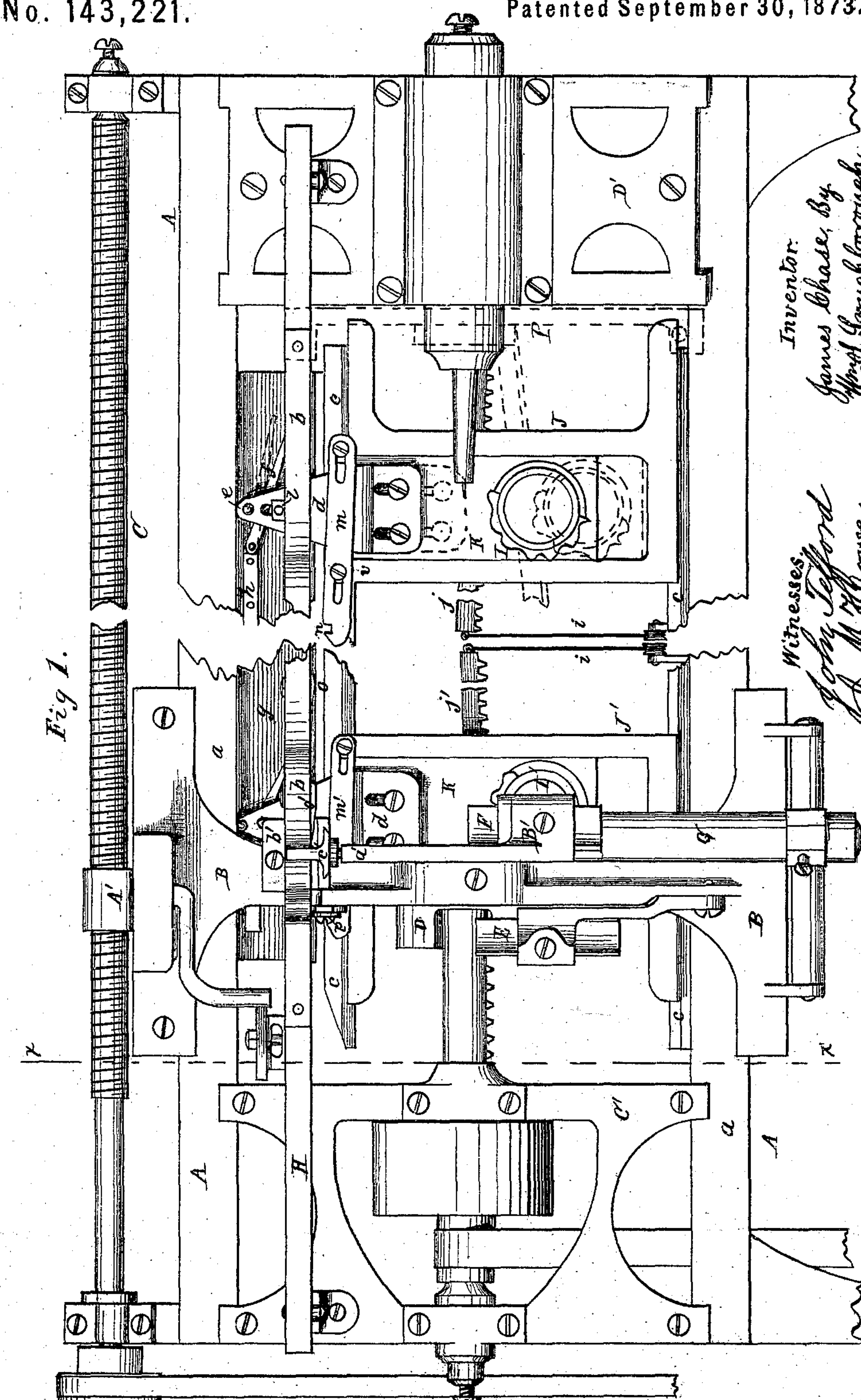
2 Sheets--Sheet 1.

J. CHASE.
Wood-Turning Lathes.

No. 143,221. Patented September 30, 1873.



Inventor.
James Chase, By
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Witnesses.
John Telford
J. M. Howe

2 Sheets--Sheet 2.

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Fig 2.

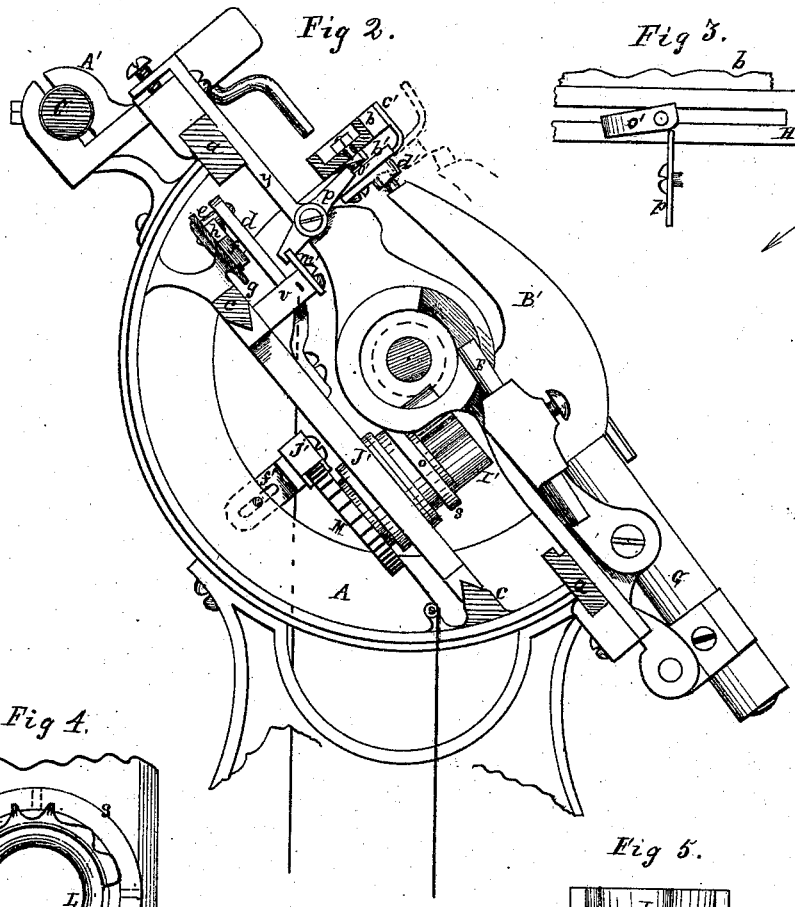


Fig 3.

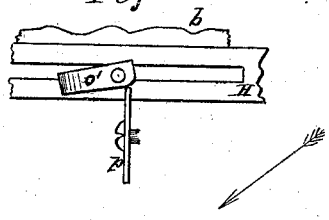


Fig 4.

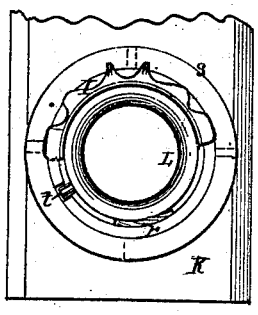


Fig 5.

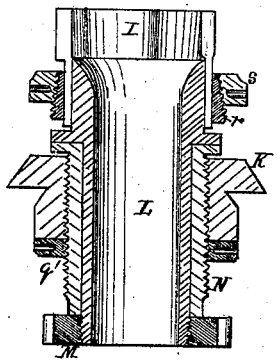
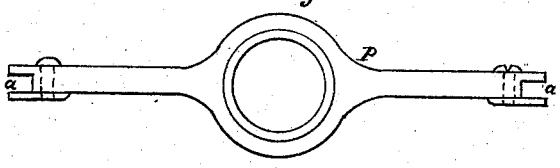


Fig 6.



Witnesses:
John Telford
J. M. Howe

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James Chase
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UNITED STATES PATENT OFFICE.

JAMES CHASE, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN WOOD-TURNING LATHES.

Specification forming part of Letters Patent No. **143,221**, dated September 30, 1873; application filed December 30, 1872.

To all whom it may concern:

Be it known that I, JAMES CHASE, of Rochester, in the county of Monroe and State of New York, have invented certain Improvements in Wood-Turning Lathes, of which the following is a specification:

My invention has for its object the turning of fancy forms used in cabinet and chair work; and it relates to improvements upon the lathe patented by me in 1867 and 1870. My invention consists in an improved form of rotary head for holding the pattern-knife, by which clogging is prevented and the knife securely held; and also in the peculiar construction and arrangement of the various parts, by which the action is made more perfect, and strength and simplicity obtained, as will be hereinafter more fully described.

In the accompanying drawings, Figure 1 is a plan view of the working parts of my lathe taken in the direction of the arrow in Fig. 2. Fig. 2 is a sectional elevation of those portions to the right of the dotted line *x*, Fig. 1. Figs. 4 and 5 are, respectively, a plan view and vertical central section of the rotary knife-head and attachments. Figs. 3 and 6 are details.

A, Figs. 1 and 2, is a skeleton frame, in semi-cylindrical form, which supports the main working parts of my improved lathe, and which, for convenience in operating, is bolted upon its sustaining-legs in such a position that, transversely, the ways *a* lie at an angle of forty-five degrees, more or less, as shown in Fig. 2. B is a tool-rest or carriage, which is fitted to move upon the ways, being driven by the feed-screw C, in the usual manner. C′ and D′ are, respectively, the head and tail blocks, fitted with the customary centers and driving-spindle. D is a die or steady rest, which fits into a circular opening made in the carriage B, directly in the line of the centers; and E is a roughing-tool for cornering the square stick preparatory to its entering the die, and it may be either made vertically adjustable in a slot in the carriage B, or hinged thereto, as shown in Fig. 2. F is a smoothing-tool, the shank B′ of which is turned to fit loosely into the socket G, and the latter is hinged to the rest B, at its outer extremity. The knife F is used to finish the plain swells and tapers required in the work, and it has a vertical movement upon its hinge, which is controlled by the pattern *b* upon the fixed beam H. The above parts are arranged and operated similarly to an ordinary gage-lathe, and, for the purpose of providing the beads and fancy moldings, I use the rotating pattern-knife I, which is rolled along the stick by means of a suitable pinion, M, and rack *j*, as described by me in my former patents. In my present invention, however, instead of attaching the rotary knife to a shaft, and mounting it upon the main carriage B, as formerly, I locate it upon an independent sliding rest, J, moving underneath the carriage B upon ways *c* attached to the bed A. This carriage lies in an inclined position parallel with B, and sufficiently below it to allow the rotating knife to pass under, and is provided with a slide, K, moving on ways at right angles, or nearly so, to the ways *c*. The axis of the rotary knife is journaled upon this slide, and said knife is, therefore, free to move to and from the stick upon the lathe-centers, as indicated by the full and dotted lines in Fig. 1. It is plain that, if such movement of the slide and knife I is controlled by a form or templet, the contour of the stick will be the result of the combined action of the pattern-knife and said form, and, also, that in the same manner the knife may be entirely removed from contact with the stick at such points along the work as may be desirable. In the turning of a large class of work, such as stand and table legs, and particularly bed-posts, it is necessary to have certain portions square at or near the center, the ornamentation being at the extremities. For this purpose I provide two secondary carriages, J and J′, having each a rotary knife; and these latter are alternately brought into action upon different portions of the stick, in the manner hereafter described. An arm, *d*, is secured to the slide K, upon the extremity of which a roller, *e*, Figs. 1 and 2, is journaled. An inclined tongue or latch, *f*, is pivoted to a plate, *g*, fixed to the bed A, and is so arranged that when the carriage J moves to the left the roller *e* runs up the incline; but when said carriage returns, the roller may pass under the tongue, lifting it, as indicated by dotted

lines in Fig. 1, the latter assuming its normal position by its gravity. The way *h* is also attached to the plate *g* continuous with *f*, and forms a track for the roller *e*, which can be of any desirable length or contour of surface. It is obvious that, as the carriage J moves to the left, the rotating knife is brought up to its work by the action of the incline *f* and roller *e*, and that when the latter arrives at the end of the way *h* the knife and slide K drop down by their gravity away from the work. The rack *j*, which gears into the pinion M on the knife-head, is pivoted at the outer end to the bed A, and is adjustable thereon vertically, and the rack is thus free to follow any undulations of the rotary head, and, if found necessary, cords *i* and suitable counter-weights may be attached to the inner extremity to retain it in constant gear with pinion M. This weight may also assist in returning the slide K to its lower position. A stud, *l*, is provided upon the arm *d*, which is adjustable in a slot in the latter, to and from the roller *e*, and another roller is journaled thereon, which runs against the lower edge of *h*, thus preventing the pattern-knife "jumping into" the work. A bar, *m*, is attached to the carriage J, and is adjustable longitudinally thereon, as indicated, by the slots in it. At the left-hand end of this bar a notch, *n*, is formed, into which a spring-dog, *p*, pivoted to the main carriage B, catches when the latter is moved into the proper position. The bar *m* is slightly inclined, and the notched extremity is beveled off, as shown, whereby the dog *p* is pushed outward and allowed to catch into the notch, whichever the direction of movement of the carriage B. A cam, *o*, is provided upon the beam H and made adjustable thereon longitudinally, its office being to trip the dog *p* and detach the secondary carriage at any desired point. The carriage J′ is similarly constructed and operated to that of J, and therefore needs no further description. The cam *o′*, however, upon the beam H, is pivoted to its supporting-block, and may swing vertically, as indicated in Fig. 3, and as the dog *p* approaches it from the left it passes freely under without detaching the carriage. The cam *o* acts in both directions to trip the dog.

The action consequent upon this arrangement of parts is as follows: Suppose it is required to turn a bed-post having a square portion centrally, and ornamental work on the ends, the carriage B is drawn back to the tail-block of the lathe, the dog *p* catching into the notch *n*, and connecting the two carriages B and J. As they advance the knives E and F begin their work, and the pattern-knife is raised to its work by the way *f h*, and continues to act upon the stick until the roller *e* falls from the guide. At this point the cam *o*, Fig. 1, trips the dog *p*, and the carriage J is at liberty to be drawn back by a suitable cord and counter-weight, Fig. 2, to its original position. Meantime the smoother F is raised from the work by the pattern *b*, and as the carriage B moves on it catches the secondary carriage J′ in the same manner as J, drawing up the rotary knife I′ to its work, which completes the ornamental work on that part, the central portion being left square, with the corners slightly clipped by the die-knife E. When the main carriage is drawn back the secondary carriage J′ is moved with it until the dog *p* is tripped by the cam *o′* before described.

The advantages of this construction are: First, rotary knives of small diameter may be used corresponding with each ornamental section of the stick, and such knives thus brought up quite close to the steady-die D, which is actually necessary to produce good work. Second, it is difficult and many times impossible to make a single rotary pattern-knife in such a proportion as to produce ornaments at certain points upon long work, the remainder of which is square or plain. By the use of the two pattern-knives each does its own section of the work independently, and, moreover, each may be adjusted independently, and thus accommodated to sticks of any length or proportion of plain part or ornament. Third, in many kinds of work one secondary rest may be discarded, the work being done mainly by the roughing-knife F, and the ornamental parts by one rotary knife at any point upon the stick.

By reference to Fig. 2 it will be observed that the edge of the pattern-knife is brought nearly up to a line with the center of the stick, and that, no matter what the inequalities in the pattern, the knife cuts equally well at the large and the small parts of it. As the knife wears away by sharpening, it becomes necessary to raise it to this line. For this purpose the axis or head L, Figs. 4 and 5, to which the knife is secured, is journaled in a sleeve, N, which is screwed into a suitable opening in the slide K. By turning the sleeve the knife is raised or lowered at pleasure. A jam-nut, *q′*, secures the adjustment. The gear M, which works in the rack *j*, is screwed or otherwise secured to the head L, and forms a shoulder against the sleeve N, which prevents end motion of the knife. This head or knife-axis L is made hollow for the purpose of permitting shavings to pass through it, and the knife is clamped to its outer periphery by means of the ring *r*, which is bored to fit the outer circle of the knife, and is turned tapering on the outside and a thread cut thereon. A conical nut, *s*, is used upon this ring, and the latter being cut apart at *t*, Fig. 4, upon its circumference, it follows that by screwing up the nut the knife is clamped tightly upon the head. The stud *t* is attached to the head, and prevents the ring *r* from turning with the nut *s*.

A decided advantage is obtained by the use of the hollow head L, since, with the old form of solid head, the shavings or chips packed into the recess formed by the knife and prevented it from cutting, necessitating frequent

clearage by the operator. With my improved head, the chips pass through and fall to the floor as fast as formed. The knives, when thus used, also may be very readily sharpened, since the files used may be passed into the opening, and the trouble of removing said knives be avoided.

There has always been a difficulty in this class of lathes in turning long work after the steady-die has passed from the end of the stick, the latter being often broken and thrown out of the lathe by the action of the other rotary knives. An ordinary steady-rest cannot be used upon square work, and I therefore provide the secondary sliding rest P, Fig. 6, also shown in dotted lines in Fig. 1. This rest is bored out to the same size as the die D, and is designed to extend across the lathe and move upon the ways *a*. As soon as may be after the passage of the carriage B over the square part of the stick, the rest is pushed along by the operator, said square portion just entering it closely, as in the case of the die. The stick is thus steadied at the right point until the pattern-knife has completed its work. The smoothing-knife F, in addition to its vertical movement upon the pattern, has also a rolling adjustment in the socket G, and some difficulty has heretofore been experienced by the breaking of the shank through the pressure of the cut, or by its extremity *a'* meeting a sudden rise in the pattern, or both together. To obviate this, the nose *a'* is turned for a short distance upon the same centers as the shank G, and a guide, *b'*, Figs. 1 and 2, is fixed to the carriage B, in which the slide *c'* is fitted loosely. The nose *a'* projects into a step, *d'*, which is vertically adjustable upon the slide *c'*, and the latter is so formed as to project over and rest upon the pattern *b*, as indicated in Figs. 1 and 2.

By this construction, the tool-stock B' is stiffened laterally, while at the same time it is free to move vertically and to be adjusted as desired. When it is raised to the position shown in dotted lines in Fig. 2, the nose *a'* leaves the socket, owing to its circumferential movement, and the tool F thus thrown entirely out of action.

In heavy work it may be advantageous to use two tools, F, to reduce the stock sufficiently at one passage of the carriage.

If desirable, the secondary carriage J' may be detached from B when the former has completed its work, and be drawn back by a counter-weight, similarly to J.

In many varieties of work but one secondary carriage, J or J', will be used; and in lathes not specially adapted to heavy sticks having squares, said carriage may be rigidly attached to the main carriage B, and in this case but one rack, *j* or *j'*, will be necessary.

The draw-bars *m m'* are adjustable longitudinally, as described, for the purpose of setting the rotary knife as near as possible to the die, such position depending upon the diameter of the knife-head. The racks *j* and *j'* are adjustable vertically with the brackets *f'*, for the purpose of accommodating the former to any vertical position of the head L and its pinion M.

It may be found desirable to pivot an angle-bar to the stud *v*, under the draw-bar *m*, Figs. 1 and 2, one arm of which should be connected with the slide K of the pattern-knife, and the other arm to be moved to the left by a dog hinged to the main carriage at *y*, thus causing the pattern-knife to rise sooner than is possible when such movement is accomplished by the use of *f* and *h*. Said dog would drag over the arm of the angle-bar as the carriage returns.

What I claim as my invention is—

1. A wood-turning lathe embracing in its construction the main sliding tool-rest B and secondary tool-rest J, the latter having a rotary pattern-knife arranged to be automatically attached to or detached from said main tool-rest, substantially as and for the purposes set forth.

2. A rotary pattern-knife, I, arranged upon the carriage or tool-rest J, and automatically adjusted toward or from the work, as the carriage moves along, by means of the guide *f h*, substantially as set forth.

3. The hollow rotary knife-head L, for permitting the free discharge of the chips therefrom, and for convenience in sharpening the knife, which can be done without removing the latter from the stock.

4. A rotary knife-head, L, in combination with the sleeve N and slide K, operating substantially as described.

5. The conical ring *r* and nut *s*, in combination with the circular knife I and head L, for the purposes set forth.

6. In combination with the main tool-rest B and secondary rest or rests J J', the dog *p* and fixed cam or cams *o* and *o'*, operating substantially as described.

7. The slide *c'* and step *d'*, in combination with the smoothing-tool stock B', for the purposes set forth.

8. In combination with the adjustable rotary head or heads I or I', the rack or racks *j j'*, pivoted at one end to the frame, and allowed to follow any undulations of the knife-head, substantially as set forth.

J. CHASE.

Witnesses:
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