(No Model.)

E. H. HUDSON.

CUTTER SUPPORT FOR HOLLOW MANDREL LATHES.

No. 305,519. Patented Sept. 23, 1884.

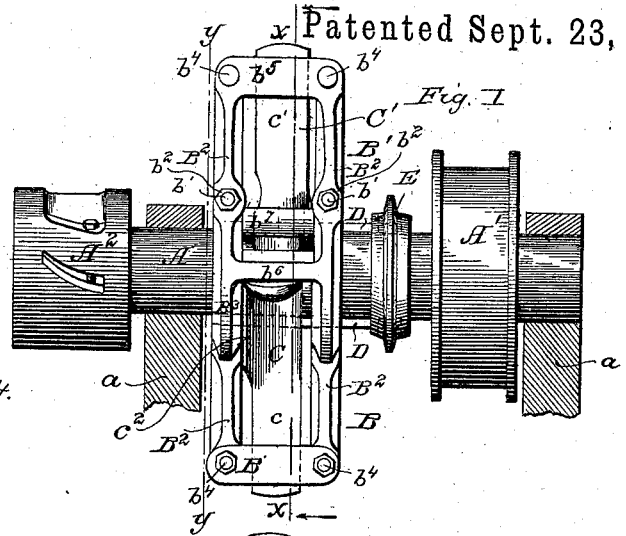

Fig. 1.

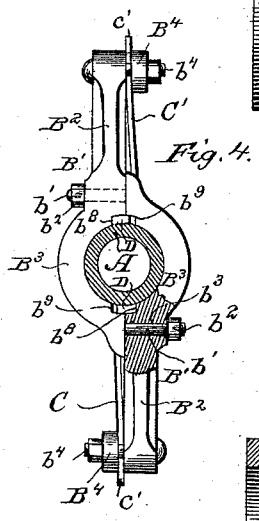

Fig. 4.

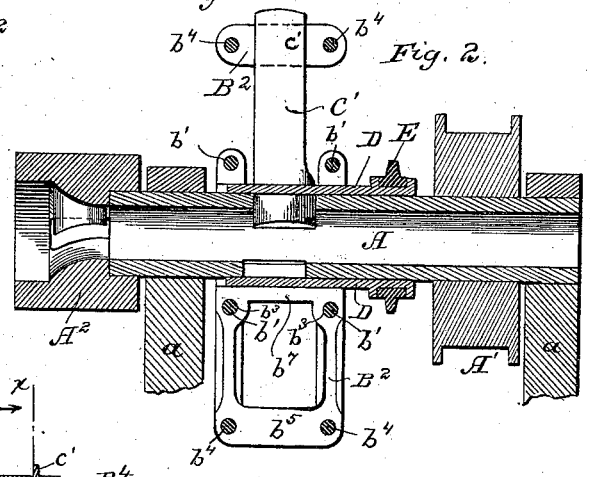

Fig. 2.

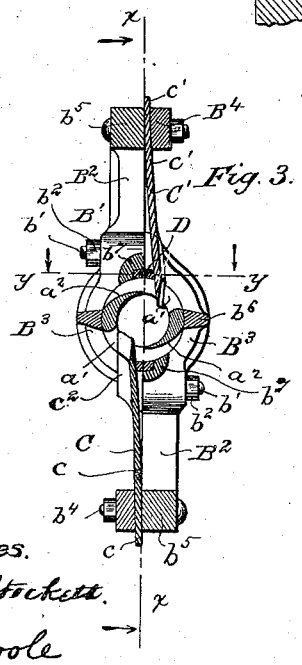

Fig. 3.

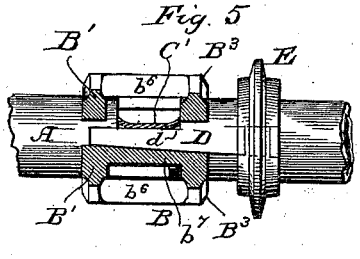

Fig. 5

Witnesses.
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UNITED STATES PATENT OFFICE.

ELISHA H. HUDSON, OF POTTERSVILLE, MICHIGAN.

CUTTER-SUPPORT FOR HOLLOW-MANDREL LATHES.

SPECIFICATION forming part of Letters Patent No. 305,519, dated September 23, 1884.

Application filed September 6, 1883. Renewed July 21, 1884. (No model.)

To all whom it may concern:

Be it known that I, ELISHA H. HUDSON, of Pottersville, in the State of Michigan, have invented certain new and useful Improvements in Cutter-Supports for Hollow-Mandrel Lathes; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to devices for supporting the cutters in the class of lathes in which a hollow mandrel is employed for carrying the cutters, through which mandrel the article passes in the act of being turned. Its object is to provide an improved construction in the devices mentioned; and it consists in the matters hereinafter described, and pointed out in the claims.

The invention is illustrated in the accompanying drawings in connection with the hollow mandrel of a lathe having movable cutters and wedges for controlling the same, such as is shown and described in an application for Letters Patent of the United States made by me on the 24th day of November, 1882.

In the accompanying drawings, Figure 1 is a side elevation of a hollow lathe-mandrel with my improved cutter-support attached. Fig. 2 is a longitudinal section through the axis of the mandrel, taken upon line *x x* of Fig. 3. Fig. 3 is a transverse section taken upon line *x x* of Fig. 1. Fig. 4 is a transverse section of the mandrel upon the line *y y* of Fig. 1, showing the cutter supporting arms in side view. Fig. 5 is a detail section upon line *y y* of Fig. 3.

A is a hollow rotating mandrel, which, as shown, is mounted in bearings *a*, and is provided with a driving-pulley, A′, and a cutter-supporting arm structure, B, having two arms, B′, which carry finishing-cutters C C′. The mandrel illustrated is intended to operate in connection with suitable devices for moving the cutters, so as to vary the form of the article being turned, such as are shown and described, for instance, in the application above referred to, and is provided with a cutter-head, A^2, in which are mounted shaping-cutters having curved cutting-edges shaped to correspond with the flared opening of the cutter-head, and which serve to reduce the square stuff or blank to a cylindrical form, and with a diameter slightly greater than the finished article and just large enough to be guided by the cylindrical bore of the mandrel in that portion which intervenes between said shaping-cutters and the finishing-cutters, as fully set forth in said application. The cutter-supporting arms B′ are preferably placed upon the mandrel between the bearing-boxes *a* and opposite the orifices *a′* in the mandrel, in which the finishing-cutters C C′ are inserted. The said cutters are preferably curved or bent transversely near their cutting-edges, and are arranged tangentially with reference to the orifice or bore of the mandrel and extended outwardly in long spring-steel shanks, the ends of which are clamped in the extremities of the said supporting-arms B. The inner or cutting ends of the knives which enter the apertures *a′* in the mandrel, as before stated, are adjustably supported and controlled by wedges D, which are arranged longitudinally against the outer surface of the mandrel, and are supported in seats in the arms B′, said wedges being longitudinally movable, so as to raise and lower the knives, and to thereby vary the diameter of the article being turned, as fully set forth in the application above referred to. The ends of the wedges D project at one side of the arms B′, and are connected to a sliding ring, E, which is placed around the mandrel A, and which may be actuated by the devices set forth in the above-mentioned application, or by any other well known or preferred devices for the same purpose.

As an improved construction in the knife-carrying arm structure B, for supporting the knives, such structure is made in two parts, B′, of similar form, each of said parts having a semicircular portion, B^3, which is placed around the mandrel, and a straight portion, B^2, the latter forming one of the cutter-supporting arms proper. The semicircular portion B^3 of the parts B′ are curved upon their inner faces to fit the exterior of the mandrel, so that by placing the said semicircular portions of the parts B′ opposite each other upon

the mandrel, they will meet at opposite sides thereof and encircle it. The parts B′ are attached to the mandrel by securing them together at the points at which the semicircular parts B^3 meet when placed around it, so as to clamp such parts firmly thereon, the arms B^2 being arranged to project in opposite directions, as shown. As preferably constructed, each part B′ has upon the end of its semicircular portion one or more transversely-projecting threaded continuations, b', constructed to pass through corresponding apertures, b^3, in the opposite part, the two parts being secured together and clamped upon the mandrel by nuts b^2, placed upon the threaded ends of such continuations outside of the opposite part, as shown more clearly in Fig. 4. Each of the parts B′, as illustrated in the drawings, is duplex, being composed of two parallel arms, which, when the structure is attached to the mandrel, are located one upon each side of the cutter-apertures a' therein, and which are connected by means of cross-pieces b^5, b^6, and b^7, cast integral therewith.

The cutters C and C′, which are located tangentially with reference to the bore of the mandrel, as before stated, are secured to the arms B′ by having the outer ends of their shanks c and c' secured between the cross-bar b^5, joining the extremities of said arms, and a clamping-bar, B^4, secured at its ends to the ends of the arms by means of bolts b^4, as shown.

The wedges D, which are located beneath the cutters C and C′ and in contact with the mandrel, are fitted into and supported at their rear edges and outer faces by seats formed in each of the two parts B′ composing the arm structure, preferably at or near the points of juncture of the semicircular portions B^3 thereof, as shown, and as preferably constructed the wedge-seats are formed partially in each of the two parts B′, as more plainly shown at b^8 and b^9 in Fig. 4. The portions b^8 of the wedge-seats, against which the rear edges of the wedges bear, are preferably located at the points of the intersection of the semicircular parts B^3 with the arms B^2, and are formed in the cross-pieces b^7, which join the two sides of the arm structure at such points, as shown clearly in Figs. 3 and 5. By this construction continuous bearing-surfaces are formed for the rear edges of the wedges, and such surfaces are protected from dust and shavings. The portions b^9 of the wedge-seats are in the form of notches in the ends of the semicircular parts B^3, such projections forming extensions of the bearing-surfaces of the outer faces of the wedges at the ends thereof, and being extended circumferentially around the mandrel, so as to permit the requisite amount of the movement in the wedges, as shown more clearly in Fig. 4. The cross-pieces b^6 are for the purpose of giving rigidity to the portions B^3 of the arm structure, and are preferably located upon the mandrel between the oppositely-arranged cutter-apertures a'. The said apertures a', as shown, are extended beneath the wedges D, and communicate with the space between the cross-pieces b^6 and b^7, so as to permit the escape of shavings from beneath the cutters, as shown and described in the application for patent before referred to.

As an improved construction in the finishing-cutters C and C′, one of said cutters, C, is constructed to cut at a slightly less depth than the other cutter, and the portion thereof that is nearest the entrance end of the mandrel is curved outwardly, as shown clearly in Figs. 1 and 3, such outwardly-turned portion being in advance of any portion of the opposite cutter, so as to remove the principal part of the material which is cut away in making the tapered or other form to the blank. The opposite cutter, C′, is so located that the central portion of its curved cutting-edge is slightly at the rear of or nearer the exit end of the mandrel than the corresponding portion of the cutter C, so that in the forward movement of the blank in passing through the spindle such cutter C′ follows the cutter first mentioned and operates to finally finish the surface of the wood. The cutter C′ is constructed to cut very slightly deeper than the cutter C, so as to remove a very thin shaving, so that its work is limited to the operation of smoothing the article. By this construction in the cutter C′ very little strain comes upon it during its operation, and its cutting-edge is therefore not liable to be worn out rapidly, and may be retained in a more perfect condition for finishing than if it were constructed to remove a considerable quantity of material from the blank. Another advantage arising from the construction last described is that the edge of the finishing-cutter C′ may be advanced to a point opposite the center of the blank, or so that it is located tangentially with reference to the cylindrical surface thereof, so that it will operate to shave the wood more smoothly than when set at an angle therewith, and when in such position will have no tendency to ride up or leave the work, as is liable to be the case when a cutter so placed is constructed to cut to a considerable depth.

The cutter C, in order to cause it to bite into the wood, is usually located with its cutting-edge at an angle to the surface of the blank, and has therefore no tendency to leave the work.

By constructing the cutter-supporting arms in two similar parts, as above set forth, such arms can be much more readily manufactured and applied than as heretofore constructed. The fact that the parts are exactly alike lessens greatly the cost of production and enables a new part to be readily and cheaply substituted for one worn out or injured. Such construction also enables the seats for the wedges to be readily and cheaply formed, the portions of the seats in the separated parts of the arm structure being readily accessible for the purpose of planing them out or otherwise finishing them.

I claim as my invention—

1. The combination, with a hollow lathe-mandrel, of a cutter-supporting arm structure consisting of two parts, B′, having semicircular portions B^3, constructed to embrace the mandrel, and means for securing said parts together, substantially as described.

2. The combination, with a hollow lathe-mandrel, of a cutter-supporting arm structure consisting of two parts, B′, each of said parts being provided with semicircular portions B^3, and with threaded projections b', constructed to enter corresponding apertures, b^3, in the other part, and nuts b^2 upon said projections for clamping the parts upon the mandrel, substantially as described.

3. The combination, with a hollow lathe-mandrel, of a cutter-supporting arm structure consisting of two parts, B′, having semicircular portions B^3, constructed to embrace the mandrel, and provided with wedge-seats formed in said semicircular portions, and means for securing said parts together, substantially as described.

4. The combination, with a hollow lathe-mandrel, movable cutters, and wedges for moving the cutters, of a cutter-supporting arm structure consisting of two parts, B′, each having semicircular portions B^3, and consisting of two laterally-separated and parallel arms, and cross-bars b^7, connecting the said arms, and having wedge-seats b^8 formed therein, substantially as described.

5. The combination, with a hollow lathe-mandrel provided with roughing-cutters constructed to reduce the blank to the size of the mandrel-bore and movable wedges, of movable finishing-cutters C and C′, supported upon said mandrel, one of said cutters, C, being provided with a flared cutting-edge, c^2, in advance of the other cutter, C′, and the said cutter C′ being constructed to cut slightly deeper than the cutter C, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

ELISHA H. HUDSON.

Witnesses:
M. E. DAYTON,
JESSE COX, Jr.