(No Model.) 2 Sheets—Sheet 1.

S. OSBORN.

CUTTER HEAD FOR WOOD WORKING MACHINES.

No. 294,067. Patented Feb. 26, 1884.

Fig. 1.

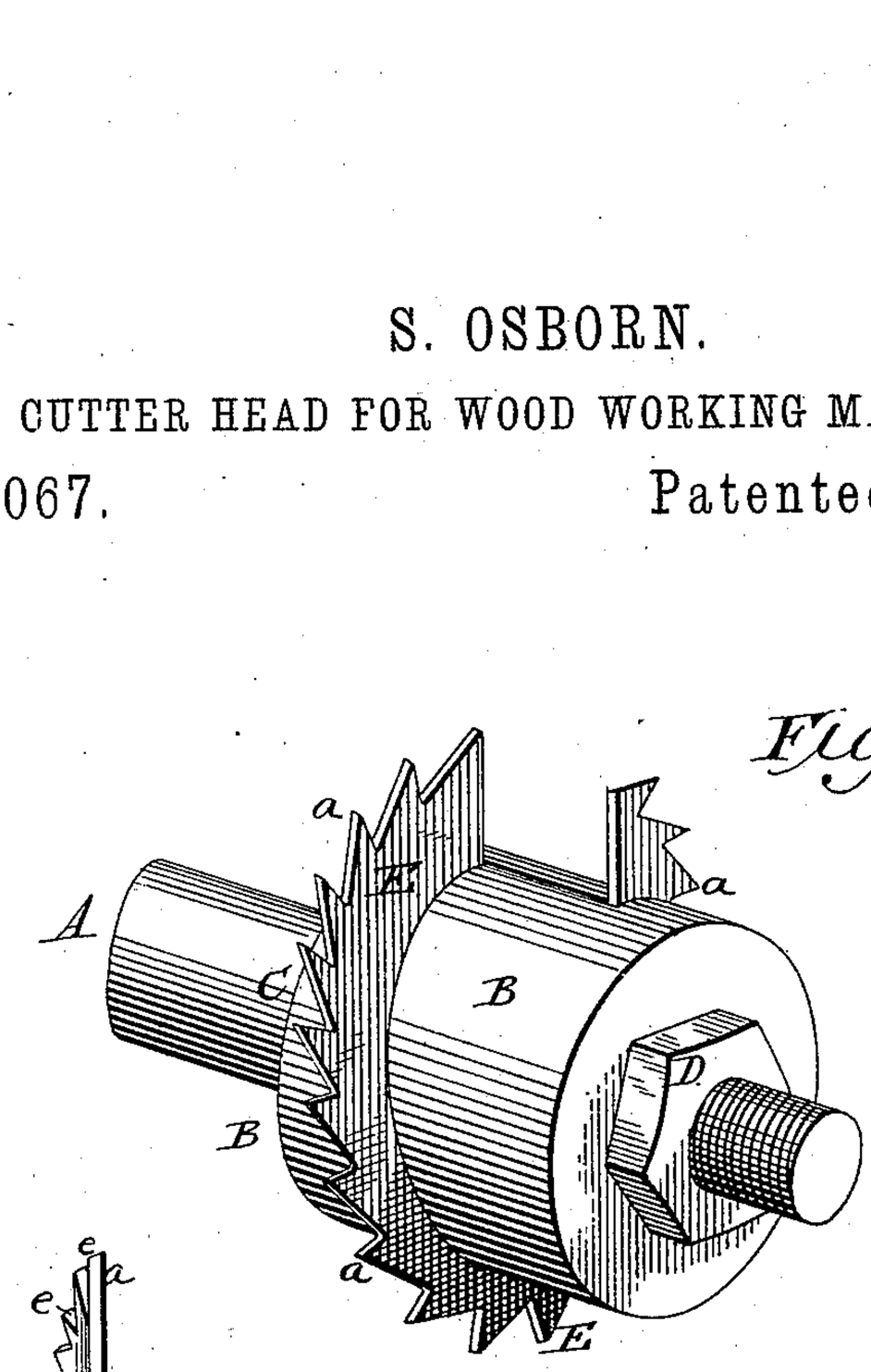


Fig. 2.
on x—x

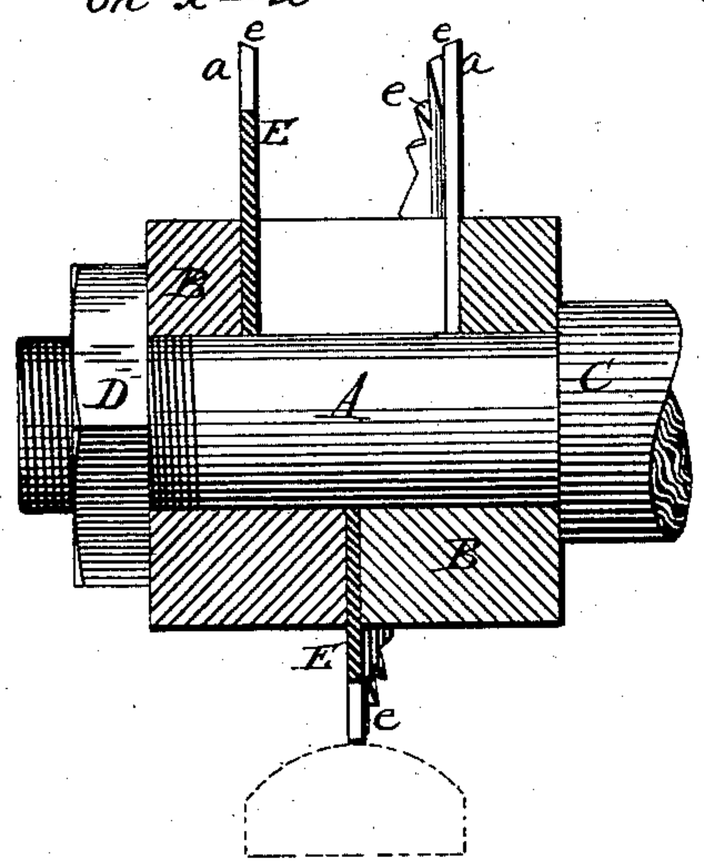


Fig. 3

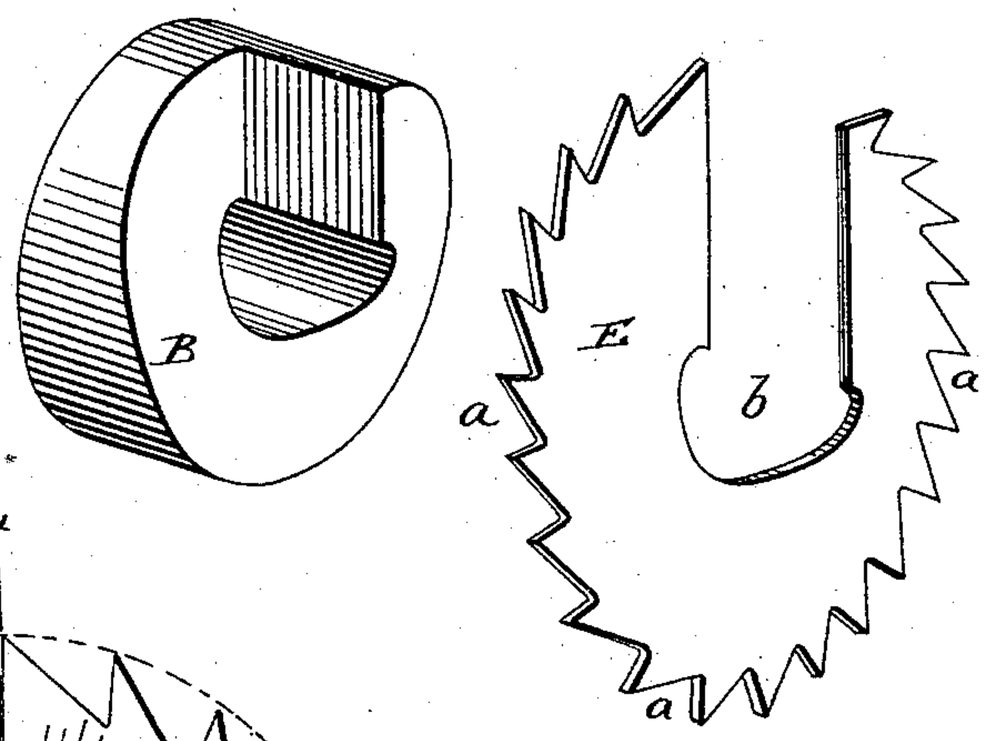
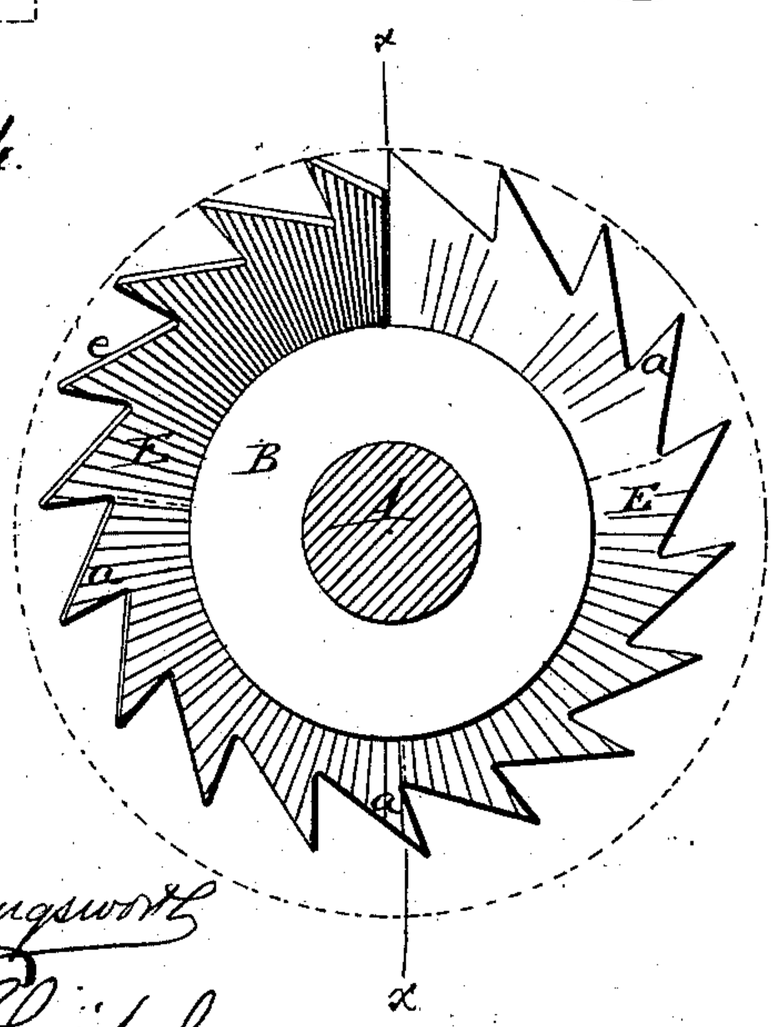


Fig. 4.



Attest

Sidney P. Hollingsworth
Harry Shipley

Inventor.
Sylvester Osborn.
By his attorney
Philip T. Dodge.

(No Model.) 2 Sheets—Sheet 2.

S. OSBORN.

CUTTER HEAD FOR WOOD WORKING MACHINES.

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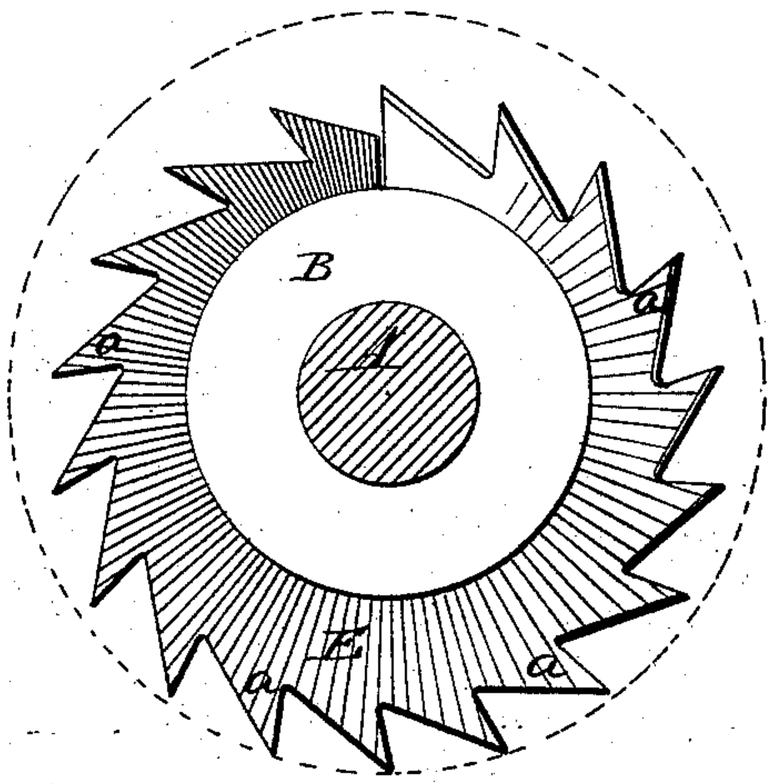
Fig. 5.



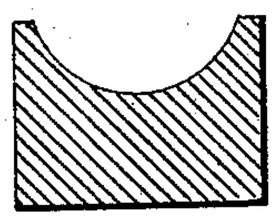
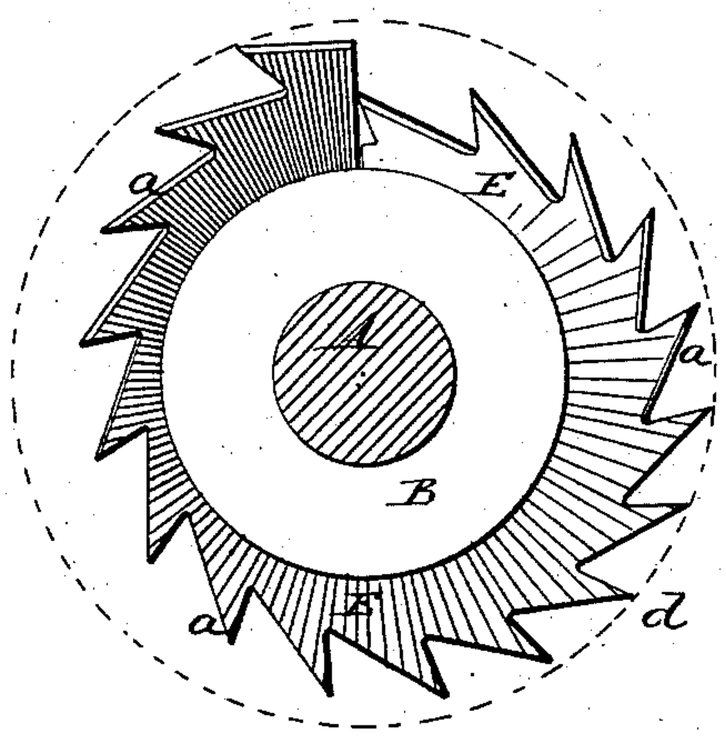


Fig. 6.



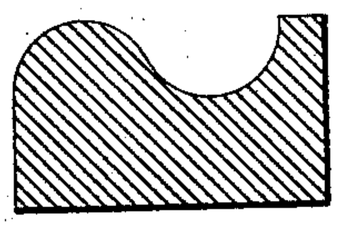
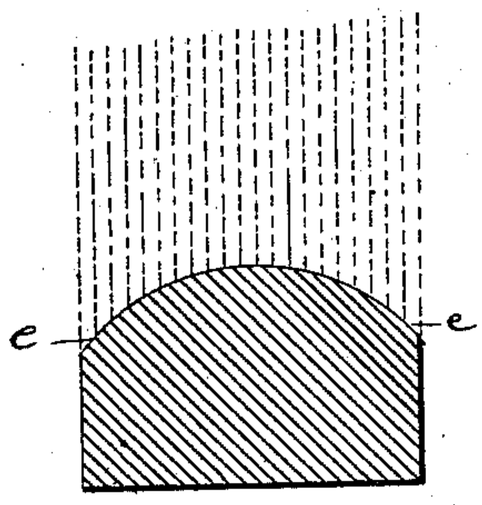


Fig. 7.



Attest.

Sidney P. Hollingsworth

Harry Shipley

Inventor.

Sylvester Osborn

By his Attorney

Philip T. Dodge.

UNITED STATES PATENT OFFICE.

SYLVESTER OSBORN, OF DAVENPORT, IOWA.

CUTTER-HEAD FOR WOOD-WORKING MACHINES.

SPECIFICATION forming part of Letters Patent No. 294,067, dated February 26, 1884.

Application filed June 20, 1883. (No model.)

To all whom it may concern:

Be it known that I, SYLVESTER OSBORN, of Davenport, in the county of Scott and State of Iowa, have invented certain Improvements in Cutter-Heads for Wood-Working Machines, of which the following is a specification.

My invention relates to a cutter-head for the production of moldings, beadings, and round surfaces and edges in general, whether of concave, convex, or compound form in cross section.

It consists, essentially, in a blade or cutter encircling a shaft or arbor, and toothed at the outer edge in a manner resembling that of a circular saw, the cutting-edge being arranged eccentrically with respect to the axis of rotation, and being also curved or bent laterally. In other words, the teeth are arranged both eccentrically and spirally about the axis. The result of this construction is that the different teeth cutting at different depths into the wood, and at different points in its width, give to the edge or surface in cross-section a curved or irregular form. By giving the series of teeth a greater or less eccentricity and by changing the extent the lateral or spiral variation of curves may be modified as desired. It is preferred to construct the cutter, as hereinafter described, of a single plate of metal, toothed on the edge, divided on one side from the center outward, and forced into a spiral form by throwing its two edges out of line; but, if preferred, the cutter may consist of two or more segments, each having a series of succeeding teeth, combined and secured in relation to each other by means of a suitable clamping-head.

Referring to the accompanying drawings, Figure 1 represents a perspective view of my cutter-head in a form adapted for the production of a convex edge. Fig. 2 represents a longitudinal central section of the cutter-head. Fig. 3 is a perspective view of the blade or cutter proper and one of the clamping-hubs by which it is carried. Fig. 4 is a side view of the head represented in Fig. 1, which illustrates the eccentric arrangement of the teeth. Figs. 5 and 6 are side views, showing modified forms of the blade, together with diagrams showing the forms of the moldings produced by them, respectively. Fig. 7 is a diagram illustrating the manner in which the teeth act in parallel planes and at different points in the width of the wood, so as to co-operate in producing the curved surface thereon.

Referring to Fig. 1, A represents a rotary arbor or spindle, which may be mounted and driven in any suitable manner; B B, two clamping-hubs mounted upon said spindle and secured against rotation by a key, spline, or equivalent device; C, a collar on the arbor against which one of the hubs is seated; D, a nut upon the arbor, bearing against the opposite hub and serving to force the two together; and E, the blade or cutter proper.

The blade is constructed, as shown in Fig. 3, of a single plate of metal provided on the outer edge with a series of cutting-teeth, *a*, and in the interior with an eccentric opening, *b*, to receive the arbor, a slit or incision being made from this central opening radially through one edge of the plate, as shown in said figure, to admit of the two edges being thrown laterally out of line with each other; or, in other words, to admit of the plate being bent into a spiral form.

As clearly shown in Fig. 4, the outer toothed edge of the cutter-plate is eccentric to the central hole, *b*. As will hereinafter more fully appear, the extent of this eccentricity and the points at which the teeth are extended to the greatest distance will be modified according to the character of the curve to be produced in the wood.

The particular cutter represented in Figs. 1, 2, 3, and 4 is designed to produce a molding with a rounded convex edge, as represented in dotted lines in Fig. 2, and for this purpose the points of the teeth are arranged successively at increasing distances from the axis as the ends of the blade are approached. In other words, in passing from the ends of the blade around its periphery toward its central portion the teeth become successively shorter, the shortest teeth being at the central portion of the periphery.

In assembling the parts, the blade is inserted between the two hubs B, and the three parts applied upon the shaft and secured firmly in position thereon, the hubs, which have their inner ends curved to correspond with each other and with the spiral curvature which the blade is to receive, being forced tightly together to compress the blade between them, as represented in Figs. 1 and 2. It will be

perceived that on revolving the arbor about its axis the various teeth of the saw will have their points carried in planes parallel to each other and at right angles to the axis of rotation, and also that the respective teeth will describe circles of different diameters, corresponding to the distances at which they stand to the axis. On passing the wooden surface lengthwise past the edge of the cutter constructed as above in a direction at right angles to the axis of the cutter, as indicated by the dotted lines in Fig. 2, the long teeth of the cutter at the ends of the blade act at the edges of the wood, and to a comparatively great depth, while the intermediate teeth, acting successively at different depths and at different points in the width of the material, serve jointly to impart to the wood a rounded outline. (Represented in said figure.) If it be desired to produce a concave instead of a convex edge, the blade will be constructed, as shown in Fig. 5, with the teeth decreasing successively in length from its central portion to its ends, the shortest teeth being at the ends. If it be required to produce a compound curve, such as represented in Fig. 6, the teeth will be made of great length at one end or side of the cutter, and of greatly diminished length to a point near the center of the periphery, where they will be again increased in length, as at *d*, for a suitable distance, and greatly shortened as they approach the opposite end of the blade.

In order to adapt the cutter-head for a smooth-finished surface upon the wood, it is desirable to bevel the ends of the teeth transversely to correspond with the lateral curvature or inclination of that portion of the curved surface upon which they act. This lateral curvature is plainly represented at *e*, Fig. 2, and in the diagram Fig. 7, which illustrates the relative points at which the different teeth act upon the wood and the manner in which they co-operate to produce the curved surface.

It will be perceived by one skilled in the art that by suitably proportioning the length of the teeth at different points on the periphery of the blade the cutter may be adapted to produce moldings of any required form in cross-section.

My improved cutter-head is advantageous because of its extreme simplicity and cheapness, of the readiness with which it may be sharpened, and of the great rapidity with which it may be operated. In the manufacture of plow-handles, wagon-spokes, and many other objects employed in connection with agricultural machinery, it will be found of special value. As before intimated, the blade may be constructed of several sections, as indicated by the dotted lines in Fig. 4. It will, of course, be understood that the construction of the hubs or clamping devices and of the means for confining the same in position, may be modified to any extent desired, provided only that they are adapted to retain the cutter-blade, whether in one piece or in several, firmly in position.

While I have referred to the blade as being of spiral form, and while it is preferred in ordinary cases to give the same a true spiral curvature, it is to be understood that this is not necessary, but that good results may be obtained by a blade the curvature of which approximates a true spiral form, or a blade of flat form arranged in a plane oblique to the axis of rotation.

The present invention is restricted to those matters and things which are hereinafter claimed, and as to all matters which may be described or shown, but which are not claimed, the right is reserved to make the same the subject of a separate application.

Having thus described my invention, what I claim is—

1. In a cutter-head, a blade arranged spirally on its axis, and provided with peripheral teeth arranged, respectively, at different distances from the axis.

2. In a cutter-head, the combination with clamping devices, substantially as shown, of a cutter consisting of a single spiral blade provided with peripheral teeth, the points of which are respectively at different distances from the axis of rotation.

3. A rotary cutter-head encircled by an eccentrically-disposed series of teeth arranged to revolve in parallel planes at right angles to the axis of rotation.

4. A cutter-head, substantially as described, provided with a spiral series of teeth terminating at different distances from the axis, and revolving in parallel planes, said teeth having their edges inclined or beveled transversely, substantially as described and shown, whereby they are caused to co-operate in producing a smooth curved surface.

5. The improved blade for a cutter-head, consisting of a single plate of metal, having a spiral curvature, an opening for the arbor, and a series of teeth the points of which are at different distances from the center of said opening.

6. In combination with the spiral blade E, having eccentrically-disposed teeth, the hubs B, and clamping devices, substantially as shown.

SYLVESTER OSBORN.

Witnesses:
JNO. W. THOMPSON,
NATHL. FRENCH.