

L. WENCHEL.  
Molding-Machine.

No. 217,183.

Patented July 1, 1879.

Fig. 1.

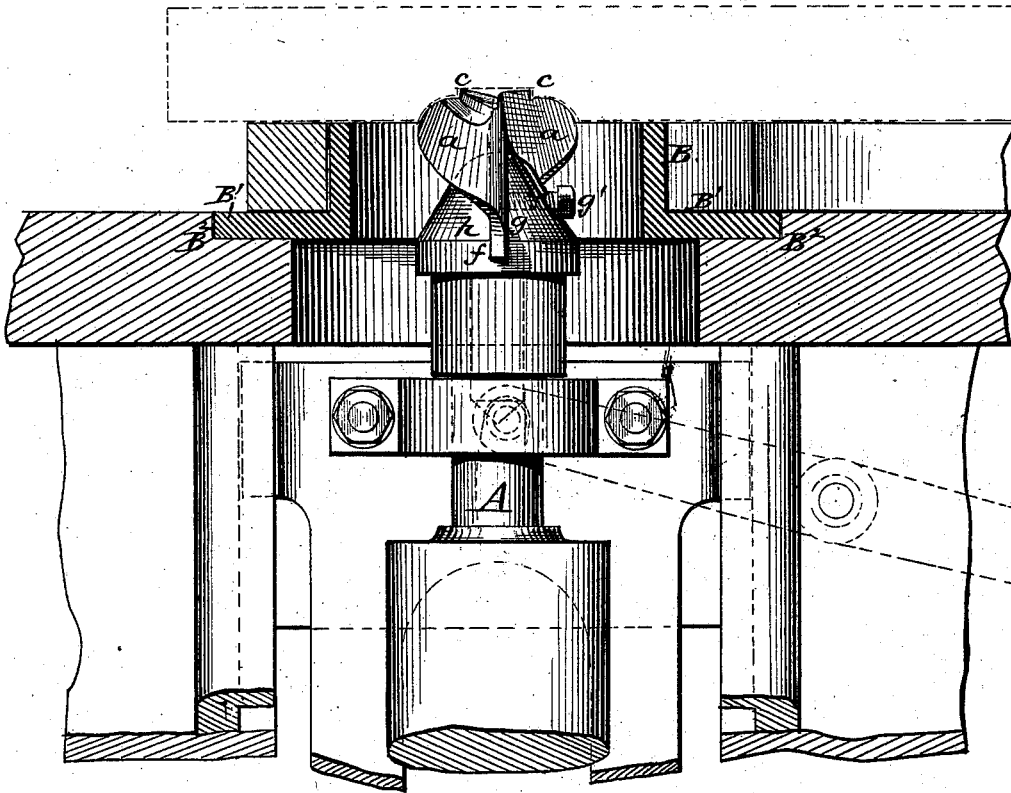


Fig. 2.

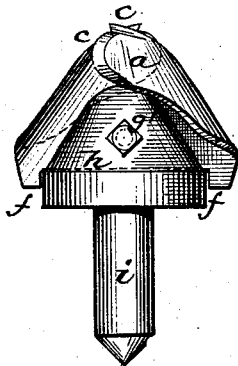


Fig. 4.

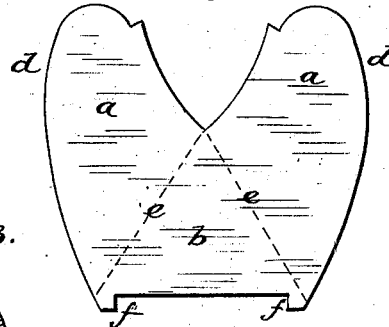
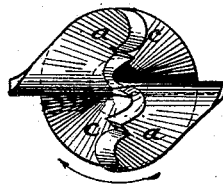


Fig. 3.



Attest:  
H. L. Perrine  
Floyd Tanner

Inventor:  
Laurence Wencel  
By Johnson & Johnson  
Atty's

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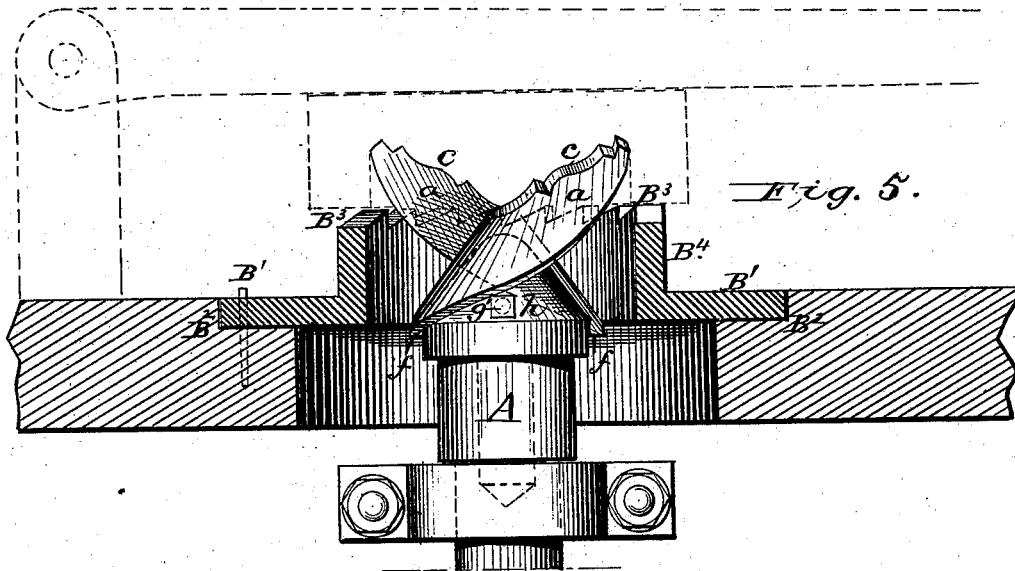


Fig. 5.

Fig. 8.

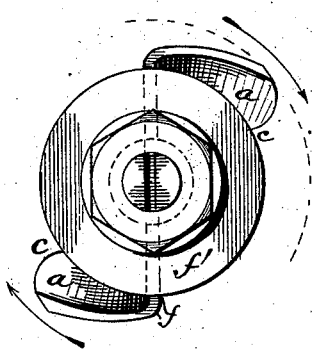
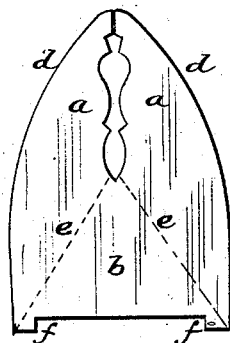


Fig. 6.



Attest:  
H. L. Perrine  
Floyd Garrison

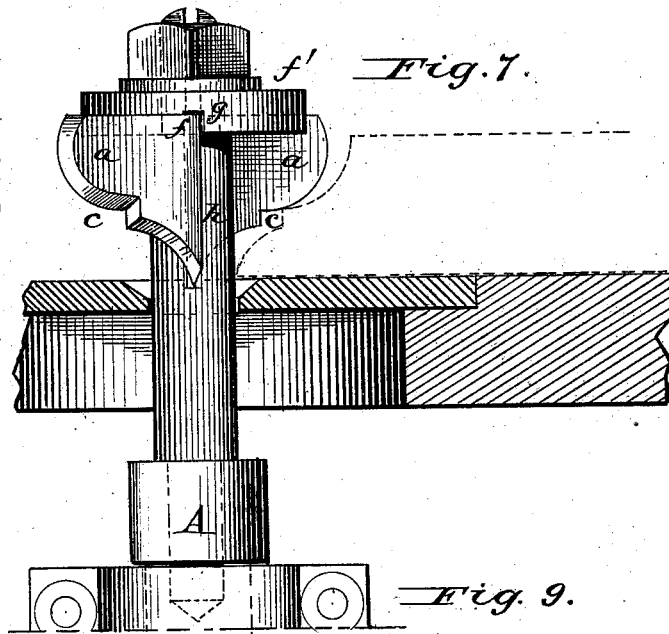
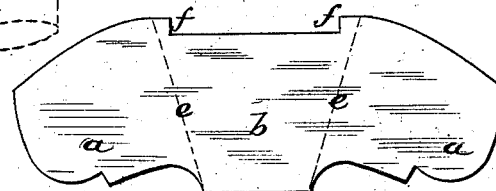


Fig. 7.

Fig. 9.



Inventor:  
Laurence Wencel  
By Johnson & Johnson  
Atty's

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Fig. 10.

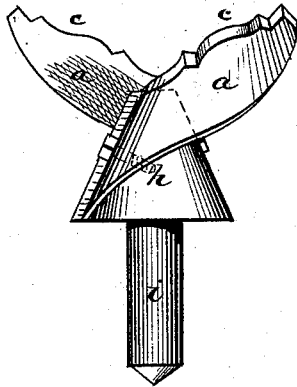


Fig. 12.

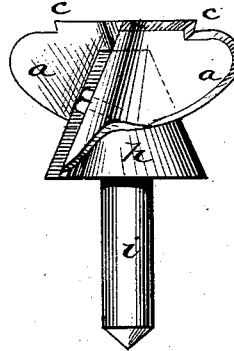


Fig. 11.

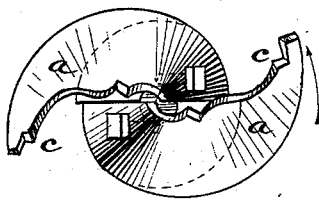


Fig. 13.

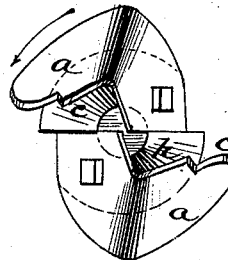


Fig. 14.

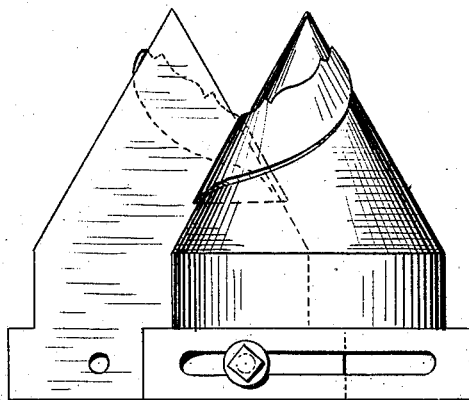
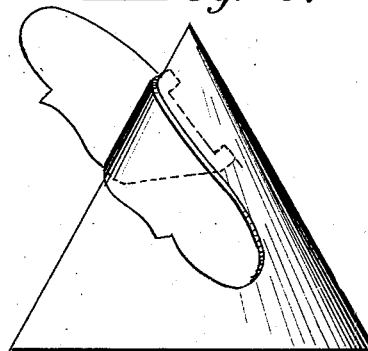


Fig. 15.



Attest:  
H. L. Penne  
Floyd Harris

Inventor:  
Laurence Wencel  
By Johnson and Johnson  
Atty's

# UNITED STATES PATENT OFFICE.

LAURENCE WENCHEL, OF BALTIMORE, MARYLAND.

## IMPROVEMENT IN MOLDING-MACHINES.

Specification forming part of Letters Patent No. **217,183**, dated July 1, 1879; application filed February 25, 1879.

*To all whom it may concern:*

Be it known that I, LAURENCE WENCHEL, of Baltimore city, in the State of Maryland, have invented certain new and useful Improvements in Molding-Machines, of which the following is a specification.

In my improved molding-machine I use an open-collar guide for the pattern, fixed upon and rising from the table, and within which a rotary cutter is adapted for operation and vertical adjustment with its carrying-spindle, making a new combination, whereby, while the pattern is supported against the outer side of the guide, the work is supported, independent of the spindle, upon the open end of said guide, leaving an unobstructed opening within and through the guide for the escape of the shavings beneath the table, so that the guide serves the double function of supporting the pattern and the work while the cutter is operating, rendering the work much easier for the operator in handling and guiding it over the cutter to conform to the pattern. The cutter works within the guide with suitable clearance. Such table-guide I use in panel-sinking and rosette-cutting, for I use an open collar, having its supporting-edge serrated or toothed, whereby I am enabled to utilize "cuttings" or blocks for producing rosettes, as the toothed edge of the collar serves to prevent the block, which is clamped thereon by a lever or otherwise, from being turned by the force of the cutter. In sinking panels, however, the supporting-edge of the guide is unbroken, so as not to hinder the free feeding movement of the work thereon over the cutter.

The guide and the toothed collar are supported upon the table by a base-rim seated in a recess in the top of the table, so as to maintain said guide and toothed collar in proper relation to the cutter, and allow of its removal when required in using the machine for edge-molding, and for interchanging it with others of smaller or larger diameter to suit different-sized cutters.

I have produced a cutter of novel construction, adapted for sinking panels, rosette-cutting, and edge-molding in machines in which a vertical spindle is used. The cutter is formed with wings, which are inclined at the hub or flat-shank connection, and extend spirally

therefrom in opposite directions over the sides of the holder, with clearing-spaces between the inner or concave sides of the wings and the outer sides of the holder, and in which the curve of the cutting-edge from the axis of the spindle is such as to give a much longer cutting-edge than the width of the molding—that is, the cutting-edge is longer than the molding it produces, so as to give a smooth cut and leave a clean edge to the molding. This construction is for panel-sinking and rosette-cutting.

The cutter operates with a shear-like cut, planing off the shavings, and holds and draws the work to it. This horizontal feeding and drawing-down action of the cutter upon the work relieves the operator of much labor, as he only holds the work for the action of the cutter and guides it according to the pattern, and in this particular my cutter gives important advantages in a molding-machine.

In sinking panels and for rosette-cutting the cutting-edge extends from the point of one wing to the point of the other, giving a continuous planing-cut; but for edge-molding the cutting-wings act in succession, the cutting-edge being adapted for the required work.

The form of the cutting-wings is one of the important features of my invention, such form being the counterpart of that part of a conical or pyramidal former over which it is produced, and it is the curved or angular form thus given which makes the cutting-edge longer than the width of the molding it produces, and gives the smooth drawing and feeding cut.

The cutting-wings I prefer to make integral with a flat shank, and at their union with said flat shank they present inclined backs, the base of the shank being provided with shoulders, whereby the cutter is adapted for use with a holder having a cross-slit, into which the cutter-shank is inserted and secured in any suitable way, the shank-shoulders being adapted to lock with the holder at the base of its cross-slit.

The cutter-holder is removably secured by a stem in a socket in the spindle or in a spindle-chuck, and the shanks of different-sized and different forms of cutters are alike fitted for use with the same holder and in the same

manner. This adaptation for quickly changing the cutters is an important matter in molding-machines, for nothing is required to effect such change but taking out the cutter-holder, removing the cutter from its cross-slit, and inserting another therein without interfering with the table-guide or the spindle which operates the cutter.

The manner of producing my cutter involves a new method of manufacturing rotary cutters in connection with a former or device employed in such manufacture; but, as this improvement forms the subject of a separate and distinct patent, it is unnecessary to give a particular description thereof in this patent.

The arrangement of the guide upon the table so as to surround the cutter renders it independent of the spindle, and avoids the jarring and wabbling movements of a guide carried by the spindle, and which shows in the molding by making it more or less irregular.

To enable others skilled in the art to which my invention relates to make and use the same, I will give a more specific description of my said invention, in connection with the accompanying drawings, in which—

Figure 1 represents a vertical section of so much of a molding-machine as illustrates a full-sized cutter made according to my invention and adapted for operation in connection with a table-guide; Figs. 2 and 3, side and top views of the panel-sinking cutter and its holder detached from the spindle; Fig. 4, the blank for such cutter when made integral with its shank; Fig. 5, the rosette-forming cutter, its holder, and open toothed rim or collar for supporting the work; Fig. 6, the blank for such cutter when formed integral with its shank; Figs. 7 and 8, side and top views of the edge-molding cutter inverted in its holder; Fig. 9, the blank for such cutter when made integral with its shank. Figs. 10 and 11 are side and top views of the rosette-cutter, the cutting-wings being without middle or integral shank and screwed to the side of the holder; Figs. 12 and 13, the panel-sinking cutter, of the same construction, and with wings of angular form separately secured; and Figs. 14 and 15, the bisected or semi-cone anvil upon which the curved wing-cutters are formed of the required size and opposite diverging lines, and with the twist or screw form so important in my cutter.

In Figs. 10 to 13 the cutter is shown as formed of separate reverse diverging wings, secured to the sides of a conical holder by screw-bolts; and in Fig. 13 the reverse wings are shown as diverging from the conical holder with angular cutting-edges; but these changes are colorable, and are within the spirit and working of my cutter, as made with the wings standing out in reverse, curved, or angular direction from a holder. My new cutter is applicable to any molding-machine having a vertical driving-spindle.

I make the cutter, preferably, from a blank of sheet-steel of suitable and uniform thickness, cut with the form of the desired cutting-

edge, and upon this blank so cut are formed the cutting-wings *a*, in a manner to leave a triangular flat shank, *b*, from which the wings are curved or extended angularly out in opposite directions—that is, one standing out from one edge of the triangular shank, and the other in opposite direction from the other edge of said shank.

The curve of the cutting-wings is such as to give a much longer cutting-edge than the width of the molding—that is, the cutting-edge by its curve is longer than the molding which it produces, and thereby gives a smooth cut and leaves a clear edge to the molding.

This construction gives the cutter a screw-like action, which draws and holds the work down to it, feeding it also as the wings revolve, thus relieving the operator of much labor, as the work is only required to be properly held and guided onto the cutter. This construction also gives a free clearance of the wings from the shavings. This construction also gives a broad and smooth inner and outer surface to the wings.

The wings are formed upon a conical or pyramidal surface in a manner to make them sections of a spiral form, whatever work they are designed for; and of whatever form the cutting-edge, its functions in the particulars stated are the same.

For panel-sinking and rosette-cutting the cutting-edge extends from the point of one wing to the point of the other, giving a continuous cut, and shaving like a plane, whether cutting with or against the grain of the stuff, and leaving it smooth and true.

For edge-molding the cutting-edge is not continuous, being interrupted by its holder, as shown in Fig. 7.

The panel-sinking cutter, (shown in Fig. 4,) when made integral with its shank, has the shape, in blank, somewhat of a heart, the horns *d d* of which, when bent into shape upon the oblique lines *e*, form the wings *a*, with a continuous cutting-edge from the point of the dotted triangle to the ends of the wings, as shown in Figs. 1 and 12, to reduce the plane surface of the molding.

The rosette-cutter (shown in Figs. 5 and 6) has the shape, in blank, of a cone bisected from the apex to the point of the dotted triangle *e*, and the points *d d*, when bent into shape upon the inclined lines *e*, form the wings *a*, with the edges of the bisected part, forming a continuous cutting-edge, rising and curving from the point of the triangle to the ends of the wings.

The edge-molding cutter (shown in Figs. 7, 8, and 9) has the wings *a* bent into shape upon the diagonal dotted lines *e*, and from which the cutting-edge extends to the ends of the wings, but not crossing the shank *b*, which is inserted into the cutter-holder. The shank *b* of these several forms of cutters has shoulders *f f* at the angles of the widest part, by which it is secured, seated within a cross-slit, *g*, in the cutter-holder *h*, which, for the panel-sinking

and rosette cutters, is of conical form, to give the proper support to the cutter and allow it to be fastened in the slit by a clamp-screw,  $g'$ .

The panel-sinking cutter works within a table-guide for the pattern, so as to operate upon the under side of the work, and the holder  $h$  is secured to the vertical spindle  $A'$  by a stem,  $i$ , suitably fitted in a socket or chuck in said spindle, which is adjusted vertically in any suitable way to project the cutter above the guide during the operation, to give the proper depth to the sunken panel and the proper form and projection to the rosette. These cutters are interchangeable in the holder  $h$ , and the latter is interchangeable with the holder for the edge-molding cutter, which operates without a table-guide or work-patterns, and (I prefer) with its edge downward, so that it works above the table and over the work, and requires a longer holder, the cutter being seated within a slit,  $g$ , and supported at its base by shoulders  $f$  and a slitted collar,  $f'$ , clamped upon the base of said cutter by a nut, as in Fig. 7. When set to the thickness of the board this cutter is fixed, and the stem of the holder forms the guide. This cutter, however, can be used as well with its edge upward to operate upon the under side of the work, and in which case the guide must be above the cutter and carried by its holder, and the table-recess will be covered by a removable plate having an opening through which the spindle passes.

I use interchangeable table-guides  $B$  for the patterns, each having a base-rim,  $B^1$ , of the same diameter to fit within a recess,  $B^2$ , in the table, but with open guide-collars  $B$ , of varying diameters to suit different-sized cutters and give the proper clearance thereto.

For panel-sinking the guide has an unbroken edge, upon which the work rests and is guided, with the pattern resting against the outer side of the guide and upon the table, as in Fig. 1, so that the shavings are discharged within the guide.

For rosette-cutting I use an open rim or collar,  $B^4$ , having its edge toothed, with the teeth  $B^3$  inclining in a direction opposite to that of the rotation of the cutter, by which I am enabled to use cuttings or blocks for the rosettes, the teeth serving to bite into and hold the cutting firm against the action of the cutter, the collar-flange  $B^1$  being pinned to the table, as shown in Fig. 5.

In cutting rosettes from a strip in the usual manner this toothed holding-collar is not required, but the plain one is used.

In Figs. 14 and 15 I have shown a cone-anvil device upon which my new cutter is formed; but, as this device and the method of manufacturing my cutter are embraced in a separate and distinct patent, no specific description thereof is deemed necessary here further than to state that the cutting-wings are formed upon the conical or pyramidal surface of the former, and are having the counterpart of such sur-

face, and such form is varied according to the size of the cutter, and whether formed at or near the apex or the base of such cone, or whether in such formation the cutting-edge stands upward or downward, as shown in the drawings.

The cutting-edge is formed upon the wings by beveling them upon the outer surface.

As the working with molding-machines is well understood, I need only say that by seating the guide in the table the pattern can be used over and around it during the operation of the cutter, and the latter can be raised and lowered within the guide and adjusted to cut the required depth in the work, which rests upon the guide, and the pattern upon the table, and is led on to the cutter, which, by its construction, draws and holds the work down and feeds it at the same time, the operator merely directing the work according to the pattern. When the work is done the spindle is lowered, the work removed from the pattern, and other work temporarily attached to said pattern for operation as before.

In machines where the spindle has no vertical adjustment the table-guide serves as a rest for the work by holding the work in commencing upon the guide, at an angle over the cutter and lowering it as the proper depth is reached. In this arrangement of the guide in relation to the cutter the shavings are discharged within the guide, as the work temporarily attached to the pattern, resting upon said guide and the table, prevents any shavings from passing out between the guide and the pattern.

I have described and shown my new cutter as being formed from a blank of sheet-steel; but it is obvious that the wings which form the cutter may be made separate from and secured in any suitable manner to a shank of any suitable form. I have also shown the wings having symmetrical curves and of angular shape as being within the spirit and practical working of my cutter, whether such cutter-wings are integral with a shank or of separate and attached parts, so long as they have the reverse relation to each other and work upon the principle stated.

I have described my sheet-steel cutter as having a function to draw and hold the work to it and to feed it to it sidewise, and in this particular it is not adapted to bore a hole like an auger, as the ends of the cutting-wings are not suited for such work, in connection with a guide for the work, and the manner of using such cutter with an adjustable spindle; nor is the form of my cutter like that of an auger; nor is there a boring-tool having wings made of sheet-steel, as in my cutter, or having the construction of my cutter.

I mean by the cutting-edge of the cutter being longer than the molding it produces that the cutter has a projection from point to point equal to the width of the cut surface, yet by the curved form of the wings giving a cut-

ting-edge of greater length than the width of the surface reduced and of the molding produced.

I claim—

1. In a machine for ornamentally working wood, a rim or collar guide for the pattern, open at both ends, having an interior diameter greater than that of the cutter, and upon the open top of which guide the work is supported for operation by a cutter adapted to work within said open guide and to draw the work down upon it.

2. In a machine for ornamentally working wood, an open-collar guide for the pattern fixed upon and rising from the table, and surrounding a revolving cutter, leaving an unobstructed space through said pattern-guide, in combination with a table having an opening coincident with said open guide, and adapted for operation as stated.

3. In a machine for ornamentally working wood, a guide for the pattern having an open collar, B, surrounding the cutter and rising from the table, and a base-rim, B', by which said guide is maintained upon the table in proper relation to a cutter adapted for adjustment and operation substantially as herein set forth.

4. In a machine for ornamentally working wood, an open collar or rim fixed upon and rising from the table, and having a toothed edge for supporting and holding the work from turning while under the action of the rosette-cutter working within said open collar.

5. In a machine for ornamentally working wood, a sheet-steel cutter having inclined cutting-wings *a a c c*, formed substantially as de-

scribed, in combination with a conical holder, *h*, for said cutter, said inclined cutting-wings extending over the surface of said holder, with clearing-spaces between the concave sides of said wings and the surface of said holder, for operation substantially as herein set forth.

6. In a machine for ornamentally working wood, a sheet-steel cutter having the cutting-wings *a a c c* and the shank-shoulders *f f*, formed substantially as herein set forth.

7. In a machine for ornamentally working wood, a sheet-steel cutter having the cutting-wings *a a c c* and the flat-shank shoulders *f f*, formed substantially as described, in combination with a holder, *h*, having a cross-slit adapted to receive the flat shank *b* of said cutter, and within which it is secured, substantially as herein specified.

8. In a machine for ornamentally working wood, a sheet-metal cutter consisting of the cutting-wings *a a c c*, inclined at the shank-connection, extending therefrom in reverse directions, the counterpart in form of a cone or pyramidal surface, giving a projection from point to point equal to the width of the cut surface, yet by their curved form giving a cutting-edge of greater length than the width of the surface reduced and of the molding produced, substantially as and for the purpose herein set forth.

In testimony whereof I have hereunto set my hand in the presence of two witnesses.

LAURENCE WENCHEL.

Witnesses:

A. E. H. JOHNSON,

J. W. HAMILTON JOHNSON.