

1,409,258.

Patented Mar. 14, 1922.

Fig. 1.

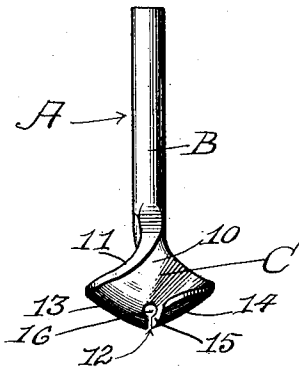


Fig. 2.

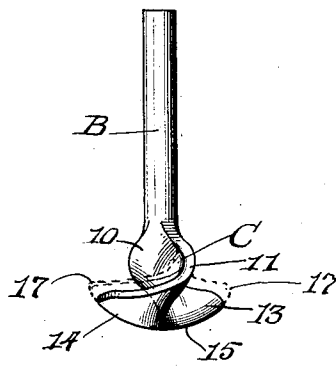


Fig. 3.

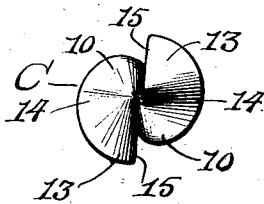


Fig. 4.

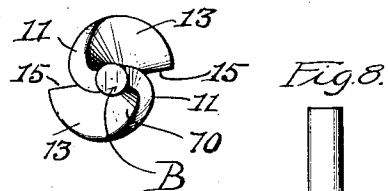


Fig. 5.

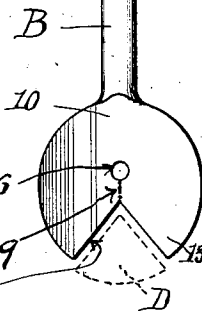
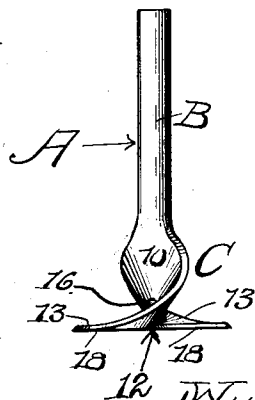


Fig. 7.

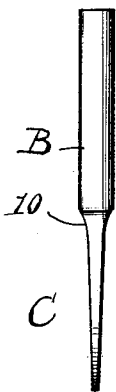
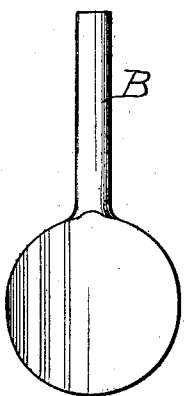


Fig. 8.



Inventor:
WILLEBALD C. STENGER,
BY *Wm. H. Brown* his Atty.

UNITED STATES PATENT OFFICE.

WILLEBALD C. STENGER, OF CHICAGO, ILLINOIS.

CARVING TOOL.

1,409,258.

Specification of Letters Patent. Patented Mar. 14, 1922.

Application filed March 29, 1920. Serial No. 369,677.

To all whom it may concern:

Be it known that I, WILLEBALD C. STENGER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Carving Tools, of which the following is a specification, reference being had to the accompanying drawings, and to the reference characters marked thereon, which form a part of this specification.

This invention relates to improvements in cutting tools for wood carving machines and the method of making the same, and more particularly relates to that type of tool illustrated in U. S. Letters Patent No. 1,330,287, issued to me on the 10th of February, 1920.

The principal object of my invention is to provide a cutting tool in which circulatory vibration, while the tool is in operation, shall be such a negligible quantity, that it may be said to be practically eliminated.

Another object is to provide a cutting tool, of the type referred to, in which more definite provision is made for carrying off the chips or shavings developed by the tool in operation, and while retaining all the advantages set forth and attained by the tool described and claimed in my former patent, shall attain the foregoing objects.

Another object of the invention is to provide for the carrying off, in addition to the chips, of those fine particles of grit which accumulate on the cutter in the center of the zone of cutting area and prevent the rotary cutter from taking as deep a cut in the wood as it would otherwise do. And finally, I desire to provide a cutting tool which shall be an improvement upon that shown in my prior patent and which shall have a wider range of utility.

These and other advantages of my present invention will be more apparent as I proceed with my specification, the invention consisting in the tool having the characteristics hereinafter mentioned and in the method of producing it as described and more particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is a view of my new cutting tool in side elevation.

Fig. 2 is a similar view, the tool being turned ninety degrees.

Fig. 3 is a bottom plan view of the cutting tool.

Fig. 4 is a top plan view of the same.

Fig. 5 is a view in side elevation, showing a modified form of the cutting head.

Fig. 6 is a side elevation of the blank of which the tool is formed, showing its condition at the end of the first step in the method of manufacture.

Fig. 7 is a view showing the same blank in end elevation.

Fig. 8 is a side elevation of the blank shown in Fig. 6, illustrating the next operation in the method of manufacture of the tool.

Referring to that embodiment of my invention illustrated in Figs. 1 to 4 inclusive; the tool as a whole, indicated at A, comprises a shank B and cutting head C. The shank B is shown as relatively long and it may be cylindrical or of any other cross sectional contour to fit within or be secured to the particular rotatable tool-holding chuck with which it is to be used.

Near its lower end, said shank is flattened at diametrically opposite portions to provide the member which becomes the head C, said flattened portion gradually tapering upwardly to form shoulders 10. The margins 11 of this tapered part are spirally curved outwardly and then downwardly, as clearly shown in Fig. 4, the tapered member being twisted from the shoulders 10 spirally about the central longitudinal axis of the shank B, extended. At its lower end the tapered portion is slit at 12, and the parts on each side of the slit 12 are bent in diametrically opposite directions in a plane substantially at right angles to the shank to constitute two wings or flange members 13, 13.

Each wing member 13 has a convex bottom surface 14 substantially approximating a part of a sphere. The end of each wing member from the outer margin inwardly to the slit 12 is beveled to form a cutting edge 15. These cutting edges, which extend radially as shown, while straight in the radial direction are, of course, shaped to conform to the curvature given to the bottom 14 of the flange member 13, as clearly shown in Fig. 2. Thus the cutting edge 15 is of a length equal to the radius of the flange or wing member 13.

The thickness of each member 13 becomes gradually greater from the end on which its cutting edge 15 is formed until it merges with the shoulder 10, and the latter also gradually thickens as it merges into the

shank B, as plainly indicated in Figs. 1, 2 and 4. This strengthens the tool, prolongs its life, and gives it increased utility.

The slit 12 in the finished tool extends, as shown, in the central median line of the head, upwardly towards the shoulder 10 and communicates with an enlarged opening or aperture 16, preferably circular in outline, as shown in Figs. 1 and 8.

The convexity of the bottom 14 of the flanges 13 may be varied to suit the necessities of different work to be performed. As for instance, the flanges 13 may be shaped as indicated by the dotted lines 17, 17', of Fig. 2, or as indicated in the modification illustrated in Fig. 5.

In Fig. 5, the twist given to the tapered wings 13 is such as to bring the bottom of the two radial cutting edges 15 into a straight line or plane, as shown at 18, normal, (substantially horizontal), to a vertical plane running through the longitudinal axis of the shank B. When so shaped, the tool is exceedingly effective in cutting plain or flat surfaces.

The method by which the tool thus described is fabricated, is illustrated in Figs. 6, 7 and 8, to which reference will now be made.

I first take a cylindrical body, or form a cylindrical body, and flatten its lower portion. This step forms the shank B, and a disc shaped lower portion, which becomes the cutting head C including the shoulders 10 and the flanges or wings 13. It will be noted that this disc shaped part is tapered, being thickest at its upper end as shown in Fig. 7.

I then stamp out or form the aperture 16 and cut out a segment D, as shown in Fig. 8 in dotted lines, from the lower portion of the disc. By severing the disc (usually by sawing) along the dotted line 19, preferably after the bending or twisting operation, a slit 12 is formed. The lower portions of the disc are bent or twisted to the desired conformation to form the wings 13. Finally I sharpen the edges of each wing to form cutting edges 15.

This method permits of great accuracy in distributing the metal. The slit 12, being in accurate axial alignment with the shank B, is thus located in the center of the zone swept by the cutting edges. The tool thus formed gives most accurate results.

This method also enables me to properly position the aperture 16 to give the desired and best results, and also to form the cutting edge in a straight, radial line before being sharpened, as well as to form a cutting edge the entire radial distance from the periphery to the center of the head C.

It is also found that, by this method, the twisting and forming of the flanges or wings

13 in the desired position is not only greatly facilitated but may be more accurately performed; also that the desired twisting of the shoulder 10 to cooperate with the desired twist of the flanges or wings, may be the more accurately accomplished.

A characteristic of my new carving tool thus described is the balanced and symmetrical arrangement whereby two cutting edges are presented to the work. Tools having a single flange and cutting edge are what I characterize as unbalanced and require great care in their manipulation in use; and usually may not be rotated at very high or very slow speeds without developing resisting force normal to the cutting edge which causes a bending of the cutting flange or head relative to the fixed shank. This is not only weakening in its effect, sometimes breaking the tool, but usually results in a circulatory vibration which produces inaccuracies in the cutting operation.

In my present balanced and symmetrical tool, with its two cutting edges, the resisting force normal to the cutting edge of one flange is balanced by a diametrically opposite and equal force normal to the cutting edge of the other flange, which eliminates all circulatory vibration and produces accuracy in the cutting operation, while the resultant of these two equal and opposite forces sets up a torque in the shank B and head C double that found in similar tools where there is but one cutting edge minus the amount resisted by the material in the head C. This latter resistance is relieved by the spring-like effect produced by the presence of the aperture 16 and the connecting slit 12 in that part (lower) of the head C which is in tension during the cutting operation.

This aperture not only eliminates metal but provides a channel for the escape of shavings. The fine grit or wood fibres which are found in some woods more than others, and which in most rotary cutting tools do not readily pass away as do the shavings, and which, adhering to the inner or central part of the cutting edge prevent its perfect operation, will be found in the use of my improved tool to enter the slit 12, to pass upwardly therethrough into the aperture 16, to fall or pass laterally out of said aperture and by being caught by the advancing inside or concave surface of the approaching flange or wings 13 to be cast off, as are the shavings. Thus the cutting edge 15 per se is automatically kept clean and free so that it can give 100% efficiency so long as it is sharp. The configuration of the cutting head C, it will also be observed, is such that the cutting edge may be repeatedly sharpened not only with ease but without varying the conformation of the working surfaces of the head C. That is to say, the cutting away of the

flanges or wings 13 by repeated sharpening operation upon the cutting edge 15 does not alter or substantially vary the angle or configuration of the cutting edge 15 or the under surface 14 of the head C.

It will be understood that in grinding the cutting edges of tools of this character, great difficulty is experienced in keeping the tool properly centered, which results in imperfect carving. In my improved tool, no such difficulty is experienced in grinding on account of the presence of the slit 12; thus great accuracy in the operation of the tool is attained.

I claim as my invention:

1. A carving tool having a shank member and an integral cutter member, the latter being a flattened, widened head divided at its lower part to form wings each having a cutting edge, the wings and the undivided part being spirally twisted and the wings bent back to steepen the pitch of the spiral.

2. A carving tool comprising a shank member and an integral cutting head member, the latter comprising a pair of wings joined to the shank member by shoulders, a straight cutting edge on each wing, the wings and shoulders being tapered from the cutting edge to the shank and being also spirally twisted so that the cutting edge of one wing shall stand diametrically opposite the cutting edge of the other.

3. A carving tool comprising a shank member and an integral cutting head member, the latter comprising a pair of wings joined to the shank by shoulders, a straight cutting edge on each wing, the wings and shoulders being uniformly tapered from the cutting edge to the shank and being also spi-

ally twisted to form diametrically opposite cutting edges.

4. A carving tool comprising a shank member and an integral cutting head member, the latter comprising a pair of wings joined to the shank by shoulders, a straight cutting edge on each wing, the wings and shoulders being tapered from the cutting edge to the shank, and being also uniformly spirally twisted to form diametrically opposite cutting edges.

5. A carving tool comprising a shank member and an integral cutting head member, the latter comprising a pair of wings spirally twisted about the shank member, a straight cutting edge on each wing the cutting head as a whole being tapered in thickness from the cutting edge to the shank, a shavings aperture in the cutting head and a slit or conduit extending from said cutting edges to said aperture.

6. A carving tool comprising a shank member and an integral cutting head member, the latter comprising a pair of tapered and spirally twisted wings, each having a straight cutting edge, the taper being uniform from the cutting edge to the shank and the spiral twist being uniform, a shavings aperture and a slit or conduit extending from the cutting edges to said aperture.

In testimony that I claim the foregoing as my invention I affix my signature, in the presence of two witnesses, this 27th day of March, 1920.

WILLEBALD C. STENGER.

Witnesses:

TAYLOR E. BROWN,
B. L. MACGREGOR.