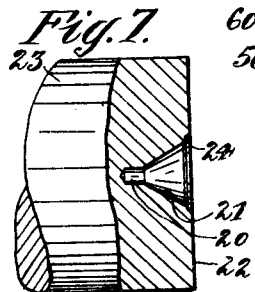
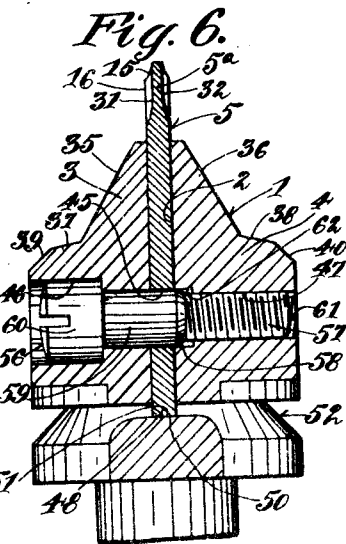
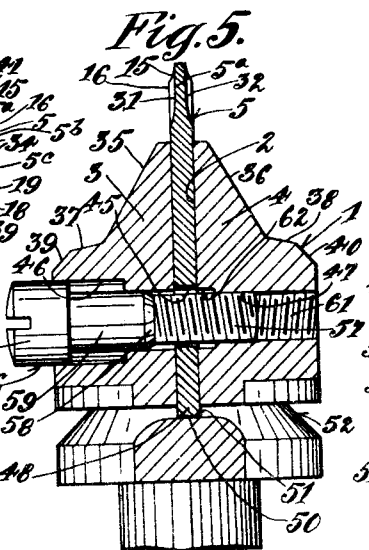
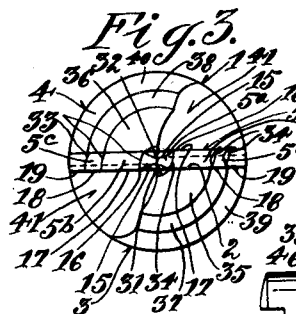
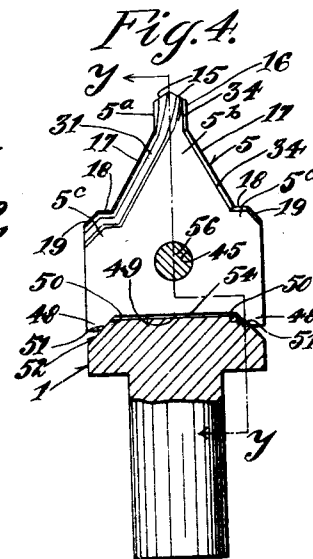
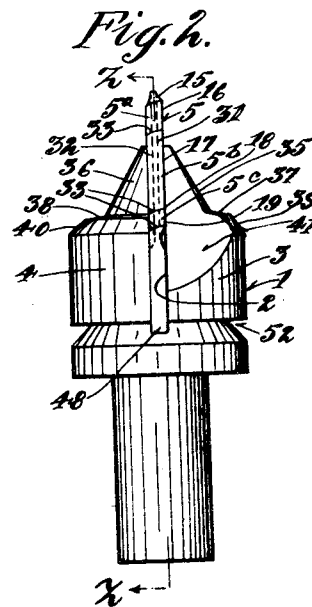
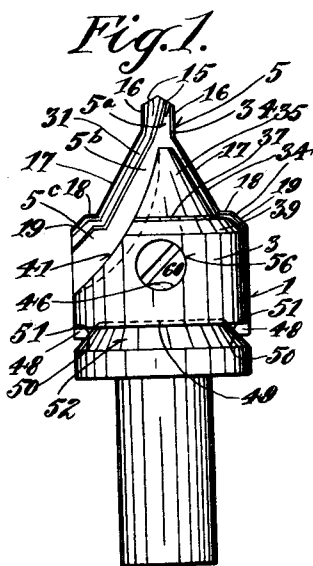


Patented Dec. 17, 1912.

1,047,466.



Witnesses:
Jacob A. Hollander
Theresa Silber

Inventor:
Frederick A. Wagner,
by R. H. Werksleb, His Attorney.

UNITED STATES PATENT OFFICE.

FREDERICK A. WAGNER, OF SENECA FALLS, NEW YORK.

CUTTER-SECURING MEANS.

1,047,466.

Specification of Letters Patent.

Patented Dec. 17, 1912.

Application filed February 9, 1912. Serial No. 676,645.

To all whom it may concern:

Be it known that I, FREDERICK A. WAGNER, a citizen of the United States, residing at Seneca Falls, in the county of Seneca and State of New York, have invented certain new and useful Improvements in Cutter-Securing Means, of which the following is a specification.

My invention has for its object the provision of new and improved cutter securing means adapted for securing flat cutters intended for cutting metal to the heads by which they are supported.

My invention is especially applicable to the character of cutter shown and described in my application for patent on combined drill, center reamer and countersink tool, original Serial No. 561,537, originally filed May 16, 1910, and is an improvement in the securing means therein shown and described.

The invention will be further readily understood from the following description and claims, and from the drawings, in which latter:

Figure 1 is a side elevation of my improved device. Fig. 2 is an edge elevation of the same. Fig. 3 is an end elevation of the same. Fig. 4 is an axial section of the same taken on the line $z-z$ of Fig. 2, the cutter-blade being shown in side elevation. Fig. 5 is a section of the same taken on the irregular line $y-y$ of Fig. 4, with the clamp-screw and cutter-blade in partly assembled relations. Fig. 6 is a similar view of the same, with the clamp-screw and cutter-blade in fully assembled relations; and, Fig. 7 is a side elevation of a shaft, partly broken away, having its end in central axial section for exposing the hole formed by the cutter-blade herein shown and described.

1 is a head which is provided with a longitudinal slot 2 extending across the longitudinal axis of the head in the end of the head, for forming end wings 3, 4. The head is preferably composed of ordinary steel, such as machinery steel, cold rolled steel, or other comparatively soft steel.

5 is a flat cutter-blade. The cutter-blade I have preferred to show is a combined drilling, center reaming and countersinking blade, and as shown, comprises a drilling section 5^a, a center-reaming section 5^b, and a countersinking section 5^c, each of which is provided with cutting-edges which merge

into each other at the respective edges of the blade. The blade is received in the longitudinal slot 2. The blade and head are provided with coacting oppositely inclined contact-faces between them for positioning and centering said blade and for rigidly securing the same in place, means being provided for clamping the wings of the head toward the blade and also clamping the blade lengthwise of the head for causing intimate contact between said contact-faces. The drilling section 5^a of the blade I have preferred to show is provided at the respective sides of its median line and at opposite sides of the blade with end cutting-edges 15 and side cutting-edges 16, these side cutting-edges being preferably parallel. At the center-reaming section 5^b, the blade I have preferred to show is provided at the respective sides of its median line and at opposite sides of the blade with inclined center-reaming cutting-edges 17 which connect with the side cutting-edges 16 and extend from said respective side cutting-edges at obtuse angles, the said inclined cutting-edges being however at an acute angle with relation to each other.

The countersinking section 5^c of the cutter-blade is provided with end cutting-edges 18 at the respective sides of its median line and at opposite sides of the blade, which are substantially perpendicular to the rotary axis of the cutter-head but recede slightly rearwardly from said perpendicular line and merge into said inclined center-reaming cutting-edges at an obtuse angle thereto, and in turn merge into inclined cutting-edges 19 which recede outwardly from said end cutting-edges 18, preferably at an obtuse angle thereto, these last-named cutting-edges being at the respective sides of the median line of the blade and at opposite sides of the blade. These cutting-edges are arranged in pairs respectively located at the lateral edges of the cutter-blade for forming a flat cutter-blade which has a pyramidally formed middle reaming-section merging into a drilling section at its outer end and a countersinking section at its inner end, so that when the tool is used, it will form a hole having an inner drilled portion 20, a middle annular tapered wall 21 which is distanced from the end 22 of the piece operated on, shown as a shaft, by the countersunk portion 24 of the hole, which is

formed at one operation by my improved device. By these means a center-ream is provided in the end of the piece operated on, instanced as a shaft, which has a clearance drill at the inner end of its tapered wall, and the outer end of the tapered wall of which is distanced from the end of the shaft and countersunk therein so as to protect the same against contact with other bodies for preventing nicking or chipping of said center-ream and preserving said center-ream in perfect condition for enabling the same to be used repeatedly without refinishing, the various sections of the hole being formed at one operation for insuring accuracy in an economical manner.

The respective edges of the blade at their cutting-edge portions are provided with clearance rakes 31, 32, shown in the form of grooves extending longitudinally of said cutting-edges and following the angles thereof in the respective side faces of said blade and extending inwardly from said cutting-edges toward the rotary axis of the head. The outer edges of said blade in rear of said cutting-edges are provided with relieving rakes 33, 34, which also extend lengthwise of said cutting-edges and follow the angles thereof.

The wings are respectively provided with parti-conical ends 35, 36, which are received at the respective sides of the median tapered center-reaming portion 5^b of the cutter-blade and project toward the drilling section 5^a of said blade and terminate at their outer ends adjacent the meeting line between said drilling section and center-reaming section, and have shoulders 37, 38, at their inner ends adjacent the end cutting-faces 18. The said wings are further provided with parti-conical portions 39, 40, between said last-named shoulders and the outer walls of said wings. The parts are so formed as to impart maximum strength to the head and maximum support to the blade when cutting. One of the side edges of each of the wings adjacent the cutting-edge of the blade at said side is provided with a recess 41.

It is preferred that the blade be made of so-called high-speed steel, and it is readily inserted and removed from the slot in the head for the purpose of renewal. The blade is provided with a hole 45 in the axial plane of said head and the wings are respectively provided with holes 46 and 47. The inner end of the blade is also preferably provided with end projections 48. A recess 49 is shown in the bottom of said blade. 50, 50, are oppositely inclined faces at the inner end of said blade which coact with similar oppositely inclined faces 51, 51, in said head, the latter being preferably formed by an annular groove 52 surrounding the periphery of said head, the inner wall of which is a continuation of said inclined faces 51. The

upper ends of said inclined faces 51 preferably coincide with the lower wall 54 of the slot 2.

56 is a clamp-screw which passes through the blade and is received in the holes 45, 46, and 47. The screw is shown as comprising a threaded end 57, a tapering portion 58 intermediate of the ends of the screw, a cylindrical portion 59, and a head 60. The hole 47 is shown as comprising a threaded portion 61 and an enlarged portion 62 arranged to receive the cylindrical portion 59 of the screw. The head 60 of the clamp-screw is arranged to snugly fit the hole 46. The hole 45 in the blade is normally slightly out of line with the holes in the wings of the head prior to the firm seating of the inclined contact-faces between the inner end of the blade and the head, as indicated in Fig. 5. When now the clamp-screw is forced inwardly, its tapered portion will contact the inner edge of the wall of the hole in the blade and force the blade inwardly for causing firm contact between the oppositely inclined faces between the blade and the head, as indicated in Figs. 4 and 6. When the blade is seated, the lower median portion of the inner end of the blade is preferably slightly distanced from the bottom wall 54 of the slot in the head, for insuring firm contact between said oppositely inclined faces between said blade and head at the inner end of the blade. The construction is such that the end strain of the clamping means causes intimate contact between the blade and the head and clamp-screw at three points, forming a triangle whose base is at right angles to the axis of the head, and whose apex is located at the contact point between the inner end of the wall of the hole in the blade and the clamp-screw. A clamping action between the wings of the head and the blade is also exerted by the clamp-screw in a direction at right angles to the stress exerted for clamping the blade against the contact-faces in the head, thus insuring an accurate axial positioning of the blade and preventing chattering and wobbling. Removal of the blade is readily accomplished by unscrewing the clamp-screw and tapping the end projections of the blade outwardly.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. The combination of a cutter-head provided with an end slot located in an axial plane of said head and extending lengthwise of said head for forming a pair of end wings, and said cutter-head further provided with a pair of oppositely inclined contact-faces adjacent to the inner end of said slot, a cutter-blade in said slot and provided with end projections having oppositely inclined contact-faces coacting with said first-named contact-faces, and means

acting upon said wings and said blade for forcing said oppositely inclined contact-faces on said blade toward said oppositely inclined contact-faces on said head.

5 2. The combination of a cutter-head provided with an end-slot located in an axial plane of said head and extending lengthwise of said head for forming a pair of end wings, a cutter-blade in said slot, the said
10 head adjacent to the inner end of said slot and the inner end of said cutter-blade collectively provided with oppositely inclined contact-faces, and a clamp-screw transverse to said first-named axial plane of said head
15 received through said blade and clamping said wings toward said blade and forcing said contact-faces toward each other, for the purpose described.

3. The combination of a cutter-head provided with an end-slot located in an axial plane of said head and extending lengthwise of said head for forming a pair of end wings and with an annular groove provided with an inner inclined wall in the periphery
25 of said head, a cutter-blade in said slot and provided with end projections having oppositely inclined inner contact-faces coacting with said first-named inner inclined wall, and a clamp-screw transverse to said first-named axial plane of said head received
30 through said blade and clamping said wings toward said blade and forcing said contact-faces on said end projections against said inner inclined wall, for the purpose described.
35

4. The combination of a cutter-head provided with an end-slot located in an axial plane of said head and extending lengthwise of said head for forming a pair of end wings, a cutter-blade in said slot, the said
40 head adjacent to the inner end of said slot and the inner end of said cutter-blade collectively provided with oppositely inclined contact-faces, said wings and said blade being provided with holes for a clamp-screw,
45 said hole in said blade being normally out

of line with said holes in said wings when said contact-faces are in unclamped relation, and a clamp-screw provided with a tapered portion intermediate of its ends arranged to engage the inner edge of the wall of said
50 hole in said blade for forcing said contact-faces together and said clamp-screw acting to clamp said wings toward said blade, substantially as described. 55

5. In combination, a flat combined drill, center-reamer and countersunk cutter-blade having at one end thereof a middle tapered center-reaming section, a drilling section at the outer end of the latter and a counter-
60 sinking section at the inner end of said tapered center-reaming section, and having oppositely disposed relatively inclined contact-faces adjacent to the other end of said cutter-blade and adjacent to the outer edges
65 thereof, and a cutter-head for said cutter-blade having contact-faces thereon with which said relatively inclined contact-faces of said blade coact, and means for clamping said blade in said cutter-head. 70

6. In combination, a flat combined drill, center-reamer and countersink cutter-blade having at one end thereof a middle tapered center-reaming section, a drilling section at the outer end of the latter and a counter-
75 sinking section at the inner end of said tapered center-reaming section, and having adjacent to the outer edges of the other end thereof a pair of oppositely disposed end projections having inner oppositely inclined
80 contact-faces, a cutter-head for said cutter-blade having contact-faces thereon with which said first-named contact-faces coact, and means for clamping said blade in said cutter-head. 85

In testimony whereof, I have hereunto subscribed my name in the presence of two subscribing witnesses.

FREDERICK A. WAGNER.

Witnesses:

LEONE T. ISENMAN,
MARY E. SCOTT.