

(No Model.)

2 Sheets—Sheet 1.

J. A. ARTHUR.
MORTISING CHISEL.

No. 522,548.

Patented July 3, 1894.

Fig. 1.

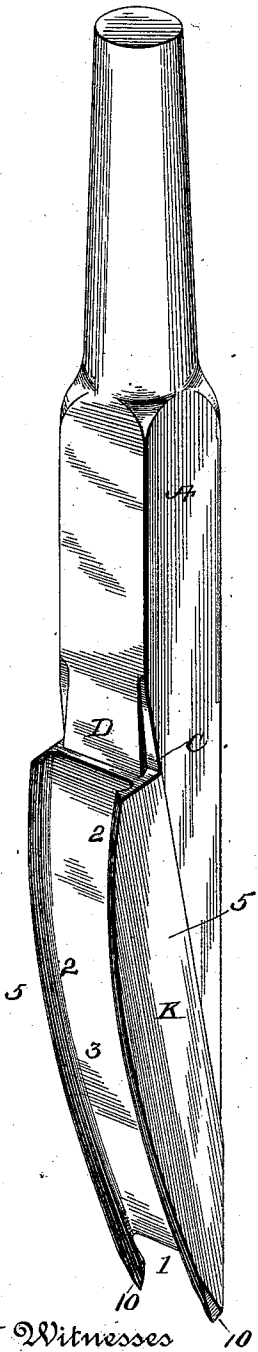


Fig. 4.

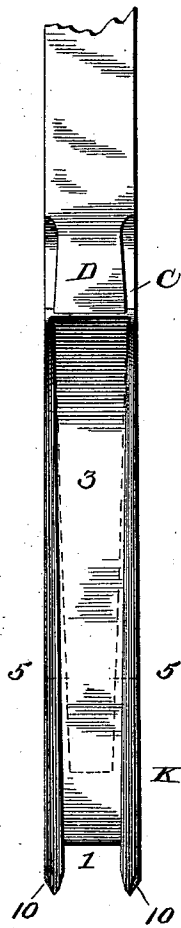


Fig. 2.

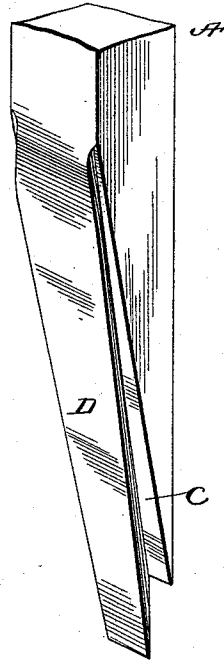
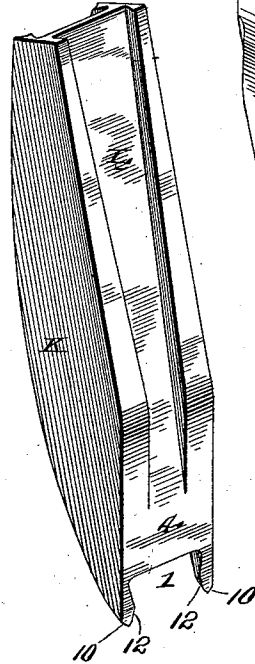
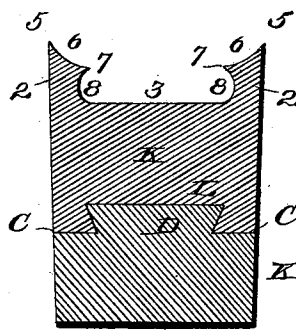


Fig. 3.

Fig. 5.



B

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Witnesses

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C. K. Davies

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2 Sheets—Sheet 2.

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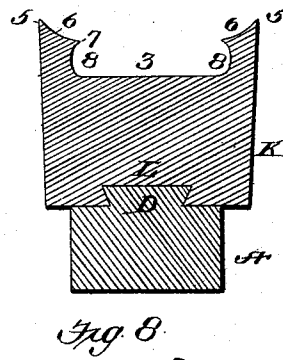
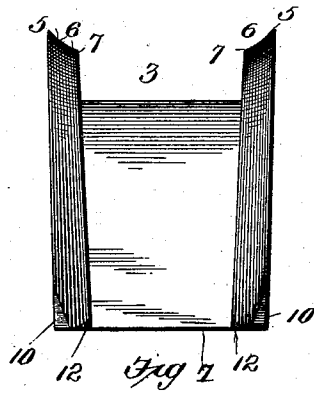
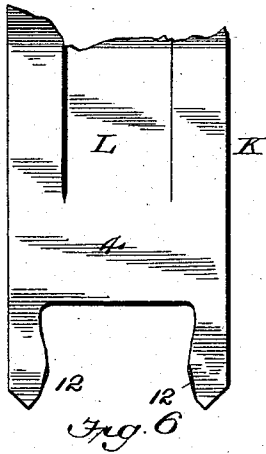


Fig. 9

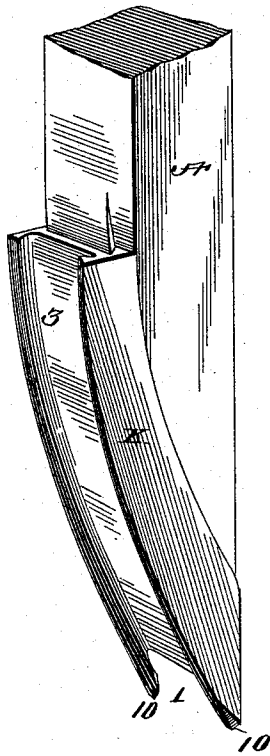


Fig. 10

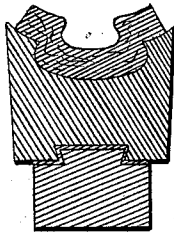


Fig. 11

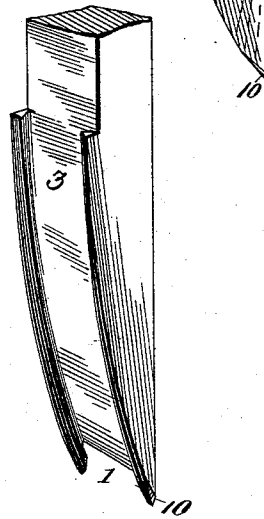
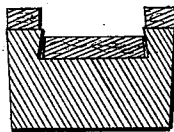


Fig. 12



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UNITED STATES PATENT OFFICE.

JOSEPH A. ARTHUR, OF CHARLESTON, WEST VIRGINIA.

MORTISING-CHISEL.

SPECIFICATION forming part of Letters Patent No. 522,548, dated July 3, 1894.

Application filed October 11, 1893. Serial No. 487,869. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH A. ARTHUR, residing at Charleston, in the county of Kanawha and State of West Virginia, have invented certain new and useful Improvements in Mortising-Chisels, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to chisels for mortising, and more especially to chisels for mortising machines, although the chisel may be used for a hand tool.

The object of the invention is to produce a chisel which will withdraw the chips from the mortise without undue pressure on the wood. Also to make a chisel with a removable cutting part or bit which may be removed from the shank for grinding or sharpening. Also to improve the cutting tool and shank in various particulars.

Figure 1 is a perspective of a chisel for mortising machines, with cutter bit connected to shank. Fig. 2 is a rear perspective of the cutter bit, and Fig. 3 is a front perspective of the part of the shank which has the tongue. Fig. 4 is a front elevation of the chisel with bit attached, and part of the shank broken away. Fig. 5 is an enlarged section of shank and bit, about on line 5, 5, Fig. 4. Fig. 6 is a broken rear view of the detachable bit. Fig. 7 is an enlarged view looking directly at the cutting edge. Fig. 8 is a cross section, showing broad bit on a narrow shank. Fig. 9 is a broken perspective showing the bit and shank with a curved dovetail tongue and groove. Fig. 10 is a cross section of shank and detachable bit with interposed patch, and showing chip. Fig. 11, is a broken perspective of a solid bit and shank. Fig. 12 is a cross sectional view of an old form of chisel and chip.

The chisel shank A, is of usual construction so far as relates to the part inserted in the socket in the machine.

The body of the tool shank has preferably a straight back B, which back is about perpendicular when the tool is in use. The face C, is inclined or beveled opposite the straight back, and this beveled face C is provided with a projecting dovetail tongue D. This tongue D is wider at the top than at the lower end of the shank.

The bit K is a piece of tempered steel with

a cutting edge or end. The rear face of this bit has a dovetail groove, L, which groove is wider at the upper than at the lower end, and of such size as to fit closely on the dovetail tongue D. Thus when the bit is placed on the shank and slipped upward, the groove on the bit embraces the tongue on the shank, and tightens as the bit moves obliquely upward. The taper of the dovetail tongue and groove is such that the bit will adhere to the shank when in use, but can be driven off by a light blow on the top of the bit. The tongue and groove are so proportioned that the end of the bit projects below the shank, and also a little beyond the plane back of the shank. (See Fig. 1.)

The cutting edge, 1, of the bit is at the end thereof, which for convenience we will call the lower end. The face of the cutting bit is grooved, so as to leave a wing 2, 2, at each side of the bit. The face of the bit is preferably struck on a curve from top to bottom, as shown in Figs. 1, and 3, and the wings (2) are also curved and project in front of the face 3 of the bit. The wings are prolonged beyond the cutting edge 1, until they terminate in points formed by the continuation of the curve of the wings of the bit, and the plane face 4 at the back of the bit. This plane face 4 is at such an angle to the back of the bit, (which is the bottom of groove L) that the plane face 4 is about perpendicular when the bit is on the shank, and is in a plane parallel with the plane back of the shank, or in the same plane therewith.

The sharpening of the bit is effected by grinding or otherwise cutting away the plane face 4 of the bit. The projecting part of the bit, as shown in Fig. 1, may be ground away until the face 4 is in the same plane as the back of the shank. A further grinding of the bit may be provided for by inserting a patch of paper or other thin substance on the tongue D of the shank before applying the bit. This causes the wedge shaped tongue to bind in the groove, and prevents the bit from rising so high on the shank, as it would otherwise do. I find this device of using a thin insertible piece or patch as the bit is ground away preferable to the extension of the bit a considerable distance beyond the shank to provide for repeated grindings.

The wings, 2, 2, are of peculiar form (see

Fig. 5). Many chisels have been devised having projecting wings, between which the chips are held, and guided from the mortise. I find defects with nearly all chisels of this class, which I have reduced by the construction I will now describe.

As is usual with mortising chisels, the blade or body is wider at the front or inclined face than at its back or plane face, to prevent binding in the mortise. The front of each of the wings 2, 2, is brought to an edge 5. The face of the wing thence inclines toward the face 3 of the bit or chisel, but preferably in a curved line, forming a concave face 6 on the wing. This face terminates at an edge 7. Behind the edge 7 the wing is undercut, preferably in a curved direction, so that a groove 8 is formed behind the edge 7. The grooves 8, at each side of the bit curve into the face of the bit, thus forming a channel behind the edges 7 of the wings, up which channel the chips will pass as they are formed by repeated cuts of the chisel. Preferably this channel formed by the lines 3, 8, 8 grows wider toward the top of the cutting bit, as is usual in chisels having wings to guide the chips.

The lower ends of the wings 2, 2, where they project below the main cutting edge 1, are made sharp in the following manner. The outer lower corner of the wing is beveled, filed, or ground away so that a plane face is made at the outer side of the wing, inclined upwardly and outwardly from the point of the wing, which point is about at the median line thereof. The continuation of the face 6 will form an edge to the wing in the plane of face 4 of the bit. The rear face of the projecting wing is cut, or filed away slightly, as shown at 12, 12, Fig. 2, so as to carry a part of the edge of the projecting wing slightly forward of the main cutting edge 1. By rear face the plane face of the cutter or bit is meant, and forward means away from the plane of said face. This forming the cutting edge of the wing in front of the main cutting edge of the bit proper I believe to be a new feature, and a very useful one in chisel construction. It must be understood, however, that the forward extension of the edge of the wing is but slight.

As shown in Fig. 8, the cutting bit may be wider than the shank. In fact each shank may be provided with a number of bits, of different sizes, and one bit may be removed and another placed on the shank without removing the shank from the machine. So a dull bit may be instantly replaced by a sharp one. The feature of removable cutting bits of different sizes I am aware is not broadly new.

In all other winged chisels with which I am acquainted the channel up which the chips pass from the cutting edge is straight and inclined forward and upward from the cutting edge at an angle to the back of the chisel. This has a tendency to throw the chips for-

ward, and it is inconvenient or impossible to cut a small mortise with such chisels.

As plainly shown in Figs. 1, 2, 9, and 11, the channel up which the chips pass from the cutting edge or edges of my chisel is curved, and at the top is nearly perpendicular, so that the chips in passing upward gradually come into a plane about parallel with the shank, and will thus be carried upward out of the mortise, instead of obliquely, as is usual. The chips will thus move freely out of a much smaller mortise than where the channel is straight. It is of course not essential that the curve should be regular, the essential thing being that the chips be carried forward from the edge so as to keep the edge clear, and then directed upward as near to the shank as may be.

The chips enter the channel at the bottom, and move up the channel. A succeeding chip cannot bear squarely against a preceding chip, any more than cubical blocks or bricks can lie in contact throughout their surfaces in an arch. Consequently the chips in the curved guide way do not become compacted together into what is practically one large chip, as I have found them do in a straight channel.

As shown in Fig. 9, the dovetail tongue and groove connection of the bit to the shank is curved in vertical direction. This is my preferred form. The curve of the back of the bit is in such case the arc of a smaller circle than the curve of the face. Thus as the bit is ground away (on face 4) it will be projected by inserting a patch of paper or other material, as I have described. In grinding, as the chisel wears away, the angle of the face 4 to the face 3 becomes more obtuse, or the chisel is made "blunter." This is desirable, as after use the metal deteriorates, and will not stand grinding to as keen an edge as a new chisel.

By making the dovetail curved in vertical direction instead of straight, a slightly greater bearing surface is afforded, and in withdrawing the chisel from the mortise the pull is more across the tongue, instead of lengthwise thereof. In driving the chisel into the wood the same advantage accrues to the curved construction.

In other winged chisels there has been a vertical edge at the inside of the wing, but so far as I am aware this edge is as far advanced as the edge 5 in my construction; by carrying the edge 7 back, the edge 5 of the wing is made a blade or cutter to trim the mortise, and the chips are cut in better form for removal, and are more firmly held in the channel. In Fig. 10, I show a chip in the channel in the chisel. The chip is made to arch by the pressure of the walls of the wing, and the sides of the chip, by reason of the arched form, are drawn away from the sides of the mortise.

(In Fig. 12, I show a cross section of a well known old form of chisel, with the chip

broken, as is actually the operation of such chisels, which will remove only the chip from the central part of the mortise.)

While it is common to undercut the wings of a chisel, such undercutting has generally been at an angle, as in cutting a dovetail groove. I round the channels for two purposes: One is to cause the chips to assume the arch form referred to, the other is to retain the strength of the metal, and avoid sharp angles below the wings, this being the place where the wings usually break.

I have illustrated various modifications of my invention, and endeavored to explain the principle thereof. It will be understood that other modifications may be made on the same principles, without avoiding my invention. I expect to cover equivalent constructions. I should consider the mere reversal of position of the tongue and groove connection between the bit and shank an equivalent construction.

In the specification, I have used the terms "vertically" and "horizontally" as referring to the chisel as ordinarily used in mortising machines, with the shank upward, and the chisel extending down. Such terms will be so understood, although of course the chisel might be used in other positions.

What I claim is—

1. A mortising chisel having a cutting edge and a chip guiding channel, said channel formed by the chisel body and undercut wings leading upward and forward from the cutting edge in successively changing directions, substantially as described.

2. A mortising chisel having a curved chip guiding channel in its face said channel bounded by undercut wings at the sides of the chisel, substantially as described.

3. A mortising chisel having wings projecting forward from its face, the wing provided with a generally vertical outer edge as 5, and an edge 7 in rear thereof, or nearer the chisel body, substantially as described.

4. A mortising chisel having side wings, said wings provided with edges as 5 and 7 connected by a curved face 6, substantially as described.

5. The mortising chisel having a straight cutting edge and a chip guiding channel leading upward therefrom, said channel formed by undercut wings, the wings being beveled to a sharp cutting edge, and the inner faces of the wings curved inward and merging into the body on curve lines without a material angle, substantially as described.

6. The mortising chisel having side wings,

the wings and face between said wings curved in vertical direction, and a plane grinding face at the opposite side, the curved face and wings being prolonged toward the cutting edge, substantially as described.

7. A mortising chisel having side wings, the wings having their lower edges for some part of their width in advance of the plane of the main cutting edge of the chisel, substantially as described.

8. In combination with the shank of a mortising chisel having a tapering dovetail tongue extending lengthwise thereof, a detachable cutter bit having a tapering groove conforming to the tongue of the shank, and extending lengthwise of the bit, substantially as described.

9. The chisel shank having a curved tongue extending in the direction of its length, and a bit having a corresponding curved groove, substantially as described.

10. The chisel shank having a plane back and an inclined face with a tongue thereon, combined with a detachable bit having a groove corresponding to said tongue, said bit extending along the inclined face and projecting beyond the plane back of the shank, substantially as described.

11. The combination of the shank having a tapering tongue extending lengthwise thereof, and the bit having a tapering groove corresponding thereto, and a filling piece between the shank and bit, substantially as described.

12. The chisel bit having a tapering groove extending in the direction of its length, in the back of said bit, and a grinding face at an angle to the face and back of the bit, and forming the edge by its junction with the general plane of the face, substantially as described.

13. The chisel bit having a curved dovetail groove in its back, and provided with a cutting edge, substantially as described.

14. The chisel bit having a vertically curved chip channel in its face, and a vertically curved groove in its back, and a plane grinding face at the back forming the edge by its junction with the general face of the bit, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH A. ARTHUR.

Witnesses:

W. A. BARTLETT,
C. K. DAVIES.