

A Tool Used To Put A Concave Edge On A Plane Iron IsA) OilstoneB) Whetstone C) Grinder D) Wire Edge

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When it comes to sharpening woodworking tools, especially plane irons, choosing the right tool is essential for achieving the desired edge quality and longevity. Among the options listed—oilstone, whetstone, grinder, and wire edge—the correct answer is a grinder. However, understanding each tool's role and how they contribute to sharpening processes is vital for woodworkers and craftsmen alike. This article explores these tools in detail, focusing on how a grinder can be used to produce a concave edge on a plane iron, as well as the benefits and considerations involved.

Understanding the Tools: An Overview

Before diving into the specifics of creating a concave edge on a plane iron, it's helpful to understand the characteristics and functions of each tool mentioned.

Oilstone

An oilstone is a traditional sharpening stone that uses oil as a lubricant. It is typically made from natural or synthetic materials and is used for fine honing and polishing. Oilstones are excellent for maintaining a sharp edge but are generally designed for flat or slightly angled edges rather than complex geometries.

Whetstone

A whetstone is similar to an oilstone but often refers to waterstones, which require water instead of oil. Whetstones come in various grit sizes, making them versatile for sharpening, honing, and polishing. They are widely used for achieving very sharp edges on knives and tools but are less suited for shaping or forming complex edge geometries like concave profiles.

Grinder

A grinder, usually an abrasive wheel or belt grinder, is a power tool capable of quickly removing material from a tool's surface. It is commonly used to reshape, sharpen, or repair blades and edges. Grinders are versatile and powerful, making them suitable for rough shaping as well as detailed work when equipped with the right attachments and techniques.

Wire Edge

A wire edge, also known as a burr, is a thin strip of metal that forms on the edge of a blade during sharpening. It indicates that the edge has been sharpened past the point of initial contact but needs to be removed for a clean, polished edge. Managing wire edges is an essential part of the sharpening process to ensure a smooth and durable edge.

The Role of a Grinder in Producing a Concave Edge

While oilstones and whetstones excel at honing and polishing, they are generally not used to shape complex edge geometries like concave profiles. Conversely, a grinder is a powerful tool capable of quickly removing material and shaping the edge to specific contours, including concave shapes.

Why Use a Grinder for Concave Edges?

- **Material Removal Speed:** Grinders can rapidly remove large amounts of material, making initial shaping efficient.
- **Custom Profiles:** With the right attachments (such as a concave jig or wheel), grinders can produce precise curved or concave edges.
- **Versatility:** They can be used for shaping, sharpening, and repairing blades with complex geometries.

Types of Grinders Used for Concave Edges

- **Bench Grinder:** Equipped with a grinding wheel, suitable for rough shaping.
- **Belt Grinder:** Offers more control and finer grinding options, often used for detailed shaping.
- **Specialized Sharpening Systems:** Some systems come with adjustable jigs for specific profiles.

Techniques for Creating a Concave Edge on a Plane Iron

Creating a concave edge on a plane iron involves careful planning, proper equipment, and technique to ensure the edge's functional effectiveness and durability.

Preparation and Safety

- Always wear safety glasses and gloves.
- Secure the plane iron firmly to prevent slipping.
- Use appropriate wheel or belt speeds to avoid overheating.

Step-by-Step Process

1. Initial Shaping with a Grinder

- Attach a suitable grinding wheel or belt.
- Use a jig or fixture to guide the iron at the desired angle.
- Slowly move the iron across the wheel, maintaining consistent contact.
- Regularly check the shape to avoid over-shaping or creating uneven surfaces.

2. Forming the Concave Profile

- Use a concave jig or a custom-built fixture that guides the iron along a curved path.
- Gradually work along the edge, ensuring even material removal.
- Frequently inspect the profile using a template or calipers.

3. Refining the Edge

- Switch to finer grit belts or wheels.
- Use a honing stone or whetstone to remove burrs and wire edges.
- Carefully polish the edge to remove any roughness and enhance cutting performance.

Tips for Success

- Take your time; rushing can lead to uneven profiles.
- Keep the tool cool to prevent tempering or warping.
- Regularly check the profile against a template or jig.
- Practice on scrap pieces before working on the actual plane iron.

Advantages and Disadvantages of Using a Grinder

While grinders are powerful and efficient, they come with their own set of pros and cons.

Advantages

- Fast material removal.
- Ability to create complex profiles like concave edges.
- Suitable for shaping and repairing blades.
- Compatible with various jigs and fixtures for precision.

Disadvantages

- Risk of overheating, which can damage the steel.
- Requires skill to produce consistent profiles.
- Potential for removing too much material if not careful.
- Less control compared to hand tools for fine honing.

Alternative Methods and Complementary Tools

Although a grinder is ideal for shaping a concave edge, finishing and honing are best performed with other tools.

Finishing with Whetstones or Oilstones

- After shaping, use fine-grit whetstones or oilstones to refine the edge.
- Hone to remove burrs and wire edges.
- Achieve a razor-sharp, polished edge suitable for woodworking.

Using a Honing Guide

- Helps maintain consistent angles during honing.
- Useful for blending the concave profile with a smooth, sharp cutting edge.

Conclusion

In summary, a grinder is the most suitable tool among the options listed for putting a concave edge on a plane iron. Its ability to rapidly shape and form complex profiles makes it an essential tool for woodworkers aiming to produce specialized edges. While it requires skill and careful technique to avoid overheating and uneven profiles, when used correctly with appropriate jigs and safety precautions, a grinder can produce precise and durable concave edges. Combining grinding with fine honing on stones ensures a sharp, functional edge that enhances the performance of your woodworking tools. Whether you are reshaping a blade or creating custom profiles, understanding the capabilities and limitations of each tool will lead to better results and longer-lasting edges for your tools.

Frequently Asked Questions

Which tool is commonly used to put a concave edge on a plane iron?

A grinder

Is an oilstone suitable for creating a concave edge on a plane iron?

No, an oilstone is typically used for sharpening, but not specifically for creating a concave edge.

What is the primary purpose of a whetstone in tool sharpening?

A whetstone is used to sharpen and refine the edge of tools, including plane irons.

Can a wire edge be used to create a concave shape on a plane iron?

No, a wire edge is a thin burr formed during sharpening, not a tool for shaping edges.

Which of the following is the correct tool for putting a concave edge on a plane iron?

C) Grinder

Why is a grinder preferred for shaping the edge of a plane iron?

Because it can remove material quickly and shape the edge into a concave form effectively.

Are oilstones effective for creating a concave edge on a plane iron?

No, oilstones are mainly used for fine honing, not shaping into a concave form.

What is the main difference between a grinder and a whetstone in tool sharpening?

A grinder uses abrasive wheels for material removal and shaping, while a whetstone is used for fine honing and polishing.

Additional Resources

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In the world of woodworking and fine tool maintenance, achieving a sharp, precisely shaped edge on cutting instruments is both an art and a science. Among the various tools employed by craftsmen and hobbyists alike, understanding their specific functions and applications is crucial. One common question that often arises is: which tool is best suited to put a concave edge on a plane iron? The options typically include oilstones, whetstones, grinders, and wire edges. This article delves into each of these tools, exploring their characteristics, uses, and suitability for creating specialized edge geometries, with a particular focus on producing a concave edge on a plane iron.

Understanding the Tools: An Overview

Before identifying the most appropriate tool for creating a concave edge, it is essential to understand the fundamental nature of each option.

Oilstone

An oilstone is a traditional sharpening stone composed of abrasive particles bonded together, often with a natural or synthetic binder. It is used with oil as a lubricant, which helps carry away debris and keeps the stone's surface clean. Oilstones are typically softer than other sharpening stones, providing a fine, smooth abrasive surface suitable for honing and polishing edges.

Whetstone

The term “whetstone” broadly refers to any stone used for sharpening blades, including oilstones, waterstones, and synthetic stones. In common parlance, “whetstone” often implies a waterstone—an artificially manufactured stone that uses water as a lubricant. These stones are available in various grits and are prized for their rapid cutting ability and ease of use.

Grinder

A grinder, especially a bench grinder or angle grinder, is a powered tool equipped with abrasive wheels. It is capable of rapidly removing material from a blade's edge and shaping or sharpening tools. Grinders are versatile and fast but require skill to avoid overheating or damaging the edge.

Wire Edge

The “wire edge” is not a tool but rather a phenomenon or a step in sharpening. When honing or grinding, a thin, wire-like burr may form along the edge of the blade, indicating that material has been effectively removed and the edge is being refined. Removing the wire edge is a crucial step in achieving a clean, sharp finish.

Creating a Concave Edge: What Does It Entail?

A concave edge on a plane iron is a specialized bevel that curves inward along the cutting edge, forming a concavity rather than a straight or convex profile. Such an edge can improve certain cutting behaviors, reduce resistance, or match specific woodworking tasks. Achieving this shape requires precise control over the sharpening process, typically involving shaping, grinding, or honing.

Key considerations when creating a concave edge include:

- Control over the angle and curvature of the edge.
- Material removal to form the desired concavity.
- Maintaining blade integrity without overheating or weakening the metal.
- Smoothness and sharpness of the final edge for effective cutting.

Given these requirements, not all tools are equally suitable. Let's analyze each option's capacity to produce a concave edge.

Assessing the Suitability of Each Tool for Concave Edging

Oilstone

Strengths:

- Excellent for fine honing, polishing, and maintaining a sharp edge.
- Suitable for refining an already shaped edge into a razor-sharp finish.

Limitations:

- Generally designed for flat or straight edges.
- Limited material removal capacity; not ideal for shaping or creating complex curves.
- Difficult to control for precise concave profiles due to the flat surface.

Conclusion:

While oilstones excel at honing and polishing, they are not suitable for initial shaping of a concave edge. Their flat surfaces do not lend themselves to creating curved profiles with the necessary control.

Whetstone

Strengths:

- Similar to oilstones, waterstones are highly effective for honing.
- Can be used with specialized jigs or guides to shape edges.

Limitations:

- Primarily used for finishing rather than initial shaping.

- Creating a precise concave profile requires significant skill and auxiliary tools.
- Flat surface limits the ability to produce complex curves directly.

Conclusion:

Whetstones are excellent for refining an edge but are not typically employed to produce a concave bevel without auxiliary shaping tools.

Grinder

Strengths:

- Powerful and capable of rapid material removal.
- Can be fitted with various grinding wheels suitable for shaping metal.

Limitations:

- Difficult to control precisely; risks overheating and damaging the blade.
- Produces a rougher surface that requires further honing.
- Shaping a consistent concave profile freehand can be challenging.

Specialized Use:

- With careful setup and specialized jigs, grinders can be used to shape the edge before honing.
- For creating a concave edge, a grinder can remove material quickly and establish the general curvature.

Conclusion:

While a grinder is capable of shaping a concave edge, achieving a precise and smooth profile requires skill, proper jigs, and subsequent finishing. It is often used as a preliminary step rather than the final shaping tool.

Wire Edge

Note:

Since a wire edge refers to a burr or thin metal flange that forms during sharpening, it is not a tool but a step in the process. Proper removal of the wire edge is essential for a clean, effective cutting edge but does not influence the shape of the bevel.

Conclusion:

The wire edge phenomenon is not a tool but an indicator of sharpening progress; it is not used to create or shape edges.

The Most Suitable Tool for Concave Edging

Based on the analysis above, the tool best suited to put a concave edge on a plane iron is the grinder—specifically, a bench grinder or an angle grinder equipped with appropriate abrasive wheels and used in conjunction with guiding jigs.

Why?

- **Material Removal:** Grinders excel at removing significant material rapidly, allowing the user to establish the desired concave curvature.
- **Control with Jigs:** When used with a properly designed jig or fixture, a grinder can produce a consistent and precise concave profile.
- **Versatility:** The ability to select different grinding wheels (such as cup wheels or cylindrical wheels) enables shaping complex curves.
- **Pre- and Post-Shaping:** The grinder can be used to rough out the shape before fine honing and polishing.

Additional Steps:

1. **Setup:** Use a jig or fixture that constrains the blade at the correct angle and guides the grinding wheel along the desired curvature.
2. **Grinding:** Carefully remove material along the edge, gradually shaping the concavity.
3. **Refinement:** Follow up with finer grinding or honing stones to smooth the surface.
4. **Polishing:** Finish with a fine stone or polishing compound to achieve a sharp, smooth edge.

Practical Considerations and Tips

Creating a concave edge on a plane iron is a task that demands precision and patience. Here are some practical tips for craftsmen undertaking this process:

- **Use Proper Safety Equipment:** Grinding produces sparks and debris; goggles, gloves, and masks are recommended.
- **Select the Right Grinding Wheel:** Cylindrical or cup wheels designed for metal shaping are ideal.
- **Employ a Jig or Guide:** To ensure consistent curvature, a custom or commercial jig helps maintain control.
- **Start with a Rough Shaping Phase:** Remove bulk material with the grinder, then switch to finer methods.
- **Check Progress Frequently:** Regularly inspect the profile to avoid over-shaping or unevenness.
- **Finish with Honing:** After shaping, use a stone or polishing tool to refine the edge and remove any burrs or wire edges.
- **Avoid Overheating:** Excessive heat can weaken the blade; cool the tool frequently and use light pressure.

Conclusion

In the quest to produce a concave edge on a plane iron, the choice of tool hinges on the specific stage of the process. While oilstones and whetstones excel in honing and finishing, they are not suitable for shaping complex profiles such as a concave bevel. The wire edge, meanwhile, is a phenomenon encountered during sharpening rather than a shaping tool.

The most appropriate instrument for establishing a concave edge is a grinder—preferably a powered, controllable device used with specialized jigs. Its ability to rapidly remove material and be guided precisely makes it the ideal choice for creating the desired curvature. Proper technique, safety precautions, and post-shaping honing ensure a functional, sharp, and durable concave edge that enhances the performance of the plane iron.

In conclusion, understanding the capabilities and limitations of each tool allows craftsmen to select the appropriate method for shaping their tools effectively. For concave edges, the grinder remains the most practical and efficient option—transforming raw material into an expertly shaped edge ready for fine honing and ultimate woodworking precision.

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