Sept. 1, 1970 S. R. BATTOCCHI 3,526,061

HONING MACHINE

Filed Jan. 25, 1968 2 Sheets-Sheet 1

FIG. 1

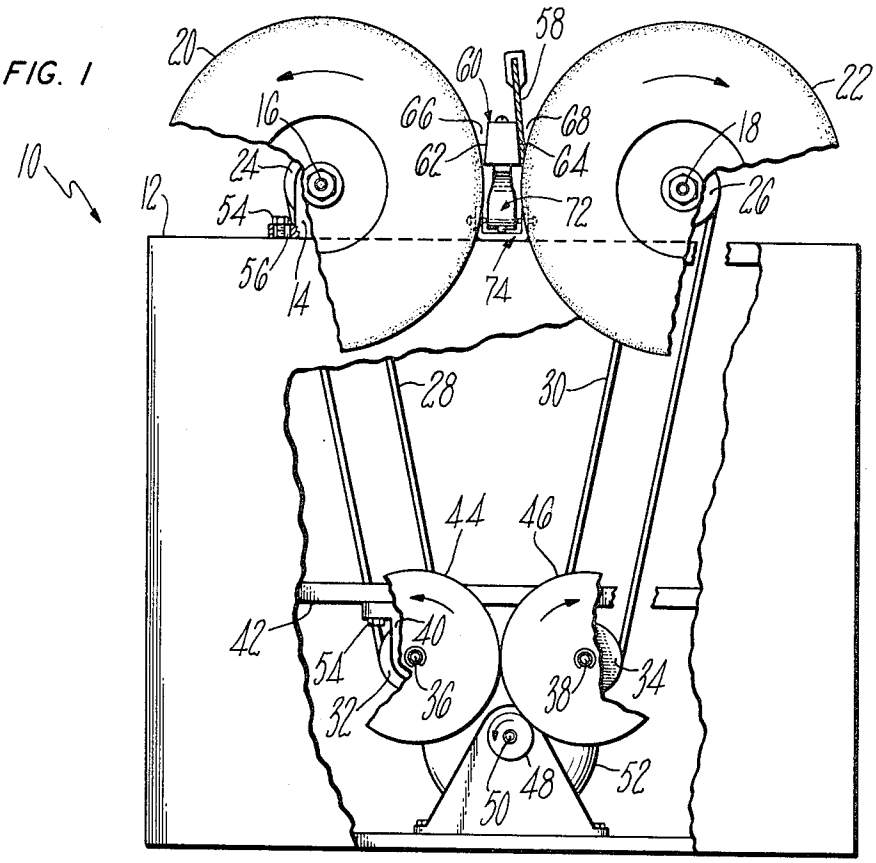


FIG. 2

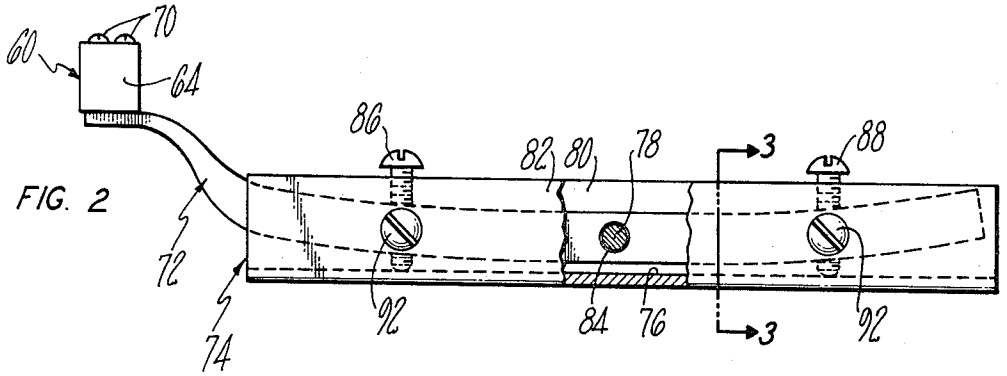
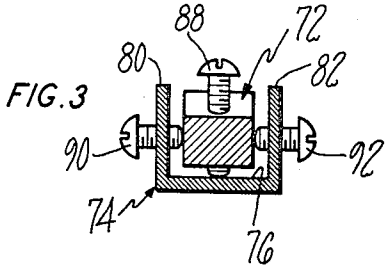


FIG. 3



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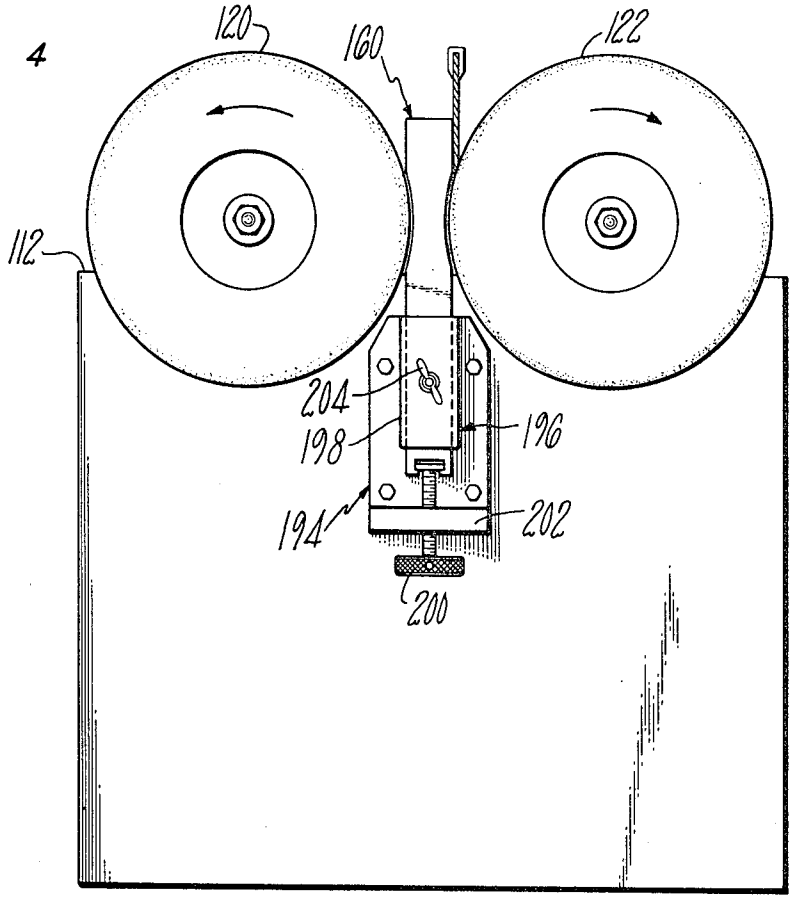
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FIG. 4



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3,526,061

HONING MACHINE

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U.S. Cl. 51—102 7 Claims

ABSTRACT OF THE DISCLOSURE

A honing machine comprising two grinding wheels in spaced peripheral alignment, a blade guide disposed between the grinding wheels, the grinding wheels and the blade guide jointly defining a pair of generally V shaped blade receiving slots, and releasable clamping means for maintaining the blade guide in adjusted relation to the grinding wheels, the grinding wheels being power driven in opposite angular directions with each grinding wheel rotating from a cutting edge toward a back edge of a blade received in one of the blade receiving slots.

This invention generally relates to power driven grinding machines and particularly concerns a double wheel honing apparatus providing two stations for honing opposite sides of an edged cutting tool.

A primary object of this invention is to provide an improved honing machine particularly suited to provide an exceptionally keen, precision finished cutting edge on a tool.

Another object of this invention is to provide a power driven machine of the above described type featuring a significantly simplified rolling friction drive.

A further object of this invention is to provide an improved honing machine which is readily adjusted for sharpening different types of blades of varying cross section and which permits an operator to be stationed on only one side of the machine during its operation.

Still another object of this invention is to provide an improved honing machine capable of uniformly honing opposite sides of a blade cutting edge throughout its entire length regardless of inherent warping, e.g., normally associated with used knife blades.

Other objects will be in part obivous and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth and the scope of the application which will be indicated in the appended claims.

In the drawings:

FIG. 1 is a front view, partly in section and partly broken away, of a honing machine constructed in accordance with this invention;

FIG. 2 is an enlarged side view, partly in section and partly broken away, of a blade guide incorporated in this invention;

FIG. 3 is a section view generally taken along line 3—3 of FIG. 2; and

FIG. 4 is a front view, partly in section and partly broken away, of a honing machine incorporating another embodiment of a blade guide.

Referring now to the drawings in detail, a honing machine **10** is illustrated having a frame **12** upon which are mounted a pair of bearing members (only one shown at **14**) supporting a pair of shafts **16** and **18** for rotation with their axes in spaced parallel relation. A pair of grinding wheels **20** and **22** are secured in spaced peripheral alignment adjacent the ends of shafts **16** and **18**. Opposite ends of the grinding wheel support shafts **16** and **18** each carry a pulley **24** ad **26** respectively connected, by

endless belts **28** and **30**, to a pair of drive pulleys **32** and **34** fixed to an additional pair of shafts **36** and **38**.

The shafts **36**, **38** are disposed in parallel relation to the axes of the grinding wheel support shafts **16**, **18** and are provided suitable bearing support by bearing members, such as that shown at **40**, which in turn are secured to a horizontal supporting member **42** of the frame **12**. A pair of drive wheels **44**, **46** are mounted on the shafts **36**, **38** with the drive wheels **44**, **46** in external peripheral contact. Drive wheel **46** is shown engaging a take-off drive wheel **48** which is preferably formed of solid rubber and mounted on an output shaft **50** of an electrical motor **52** adapted to be connected to a suitable source of electrical power.

The respective bearing members such as **14** and **40** are preferably adjustably secured to the frame **12** by fasteners such as at **54** which are received in elongated slots such as at **56** permitting relative lateral adjustment of the support shafts for the grinding wheels **20**, **22** and the drive wheels **44**, **46**.

To minimize operator movement during successive operations while additionally ensuring precision finishing of a tool, such as knife blade **58**, a blade guide block **60** is interposed between the spaced peripherally aligned grinding wheels **20**, **22**. The blade guide block **60** is shown positioned above a plane containing the axes of the grinding wheel support shafts **16**, **18**, and flat sidewall surfaces **62**, **64** are formed on opposite sides of blade guide block **60** adjacent grinding wheels **20**, **22**, respectively. Each sidewall surface **62**, **64** is shown in FIG. 1 as being inclinded to the vertical axis of the blade guide block **60** with its lower edge near the adjacent grinding wheels **20**, **22**.

Once located in position relative to the grinding wheels **20**, **22**, the blade guide block **60** in conjunction with the grinding wheels **20**, **22** define a pair of generally V shaped blade receiving slots **66**, **68** adjacent the rim of each grinding wheel **20**, **22**.

To virtually eliminate any possibility whatsoever of metal slivers, e.g., being formed on the cutting edge of a blade being honed, the motor **52** is energized to rotate grinding wheels **20**, **22** in opposite angular directions such that each grinding wheel **20**, **22** is directed from the cutting edge toward the back edge of the blade **58** regardless of whether it is being drawn through blade receiving slot **66** or **68**. During a honing operation, the sidewall surfaces **62**, **64** of the guide block **60** stabilize the blade **58** while opposite sides of its cutting edge are presented to the rim of each of the grinding wheels **20**, **22**, which rotate at substantially the same velocity in opposite angular directions in a significantly simplified rolling friction driving arrangement. Thus, a precision finished edge is ensured since even an exceptionally long blade will be uniformly drawn past the slot between the guide block **60** and the rim of the adjacent grinding wheel, with only a slight amount of pressure being exerted on the back edge of the blade **58**. Even highly warped blades of extra long length will be effectively honed to a keen cutting edge by drawing the blade alternately through one blade receiving slot **66** and then the other **68**. The longitudinal length of the guide block **60** closely corresponds to the thickness of the grinding wheels to ensure that the exact contour of the blade is drawn across the rims of the grinding wheels **20**, **22** along the full blade length.

The honing machine **10** of this invention is particularly suited to compensate for worn grinding wheels **20**, **22** as well as for wearing away of the blade guide block **60**, and, additionally, to accommodate variations in different sizes and types of edged tools which are to be honed.

For these purposes, the blade guide block **60** is releasably secured by fasteners such as at **70** to an elongated rocker arm **72** of arcuate configuration suitably clamped

in position within a channel **74** of U shaped cross section firmly secured to the frame **12** with the convex side of the rocker arm **72** adjacent a floor **76** of the channel **74**. The guide block **60** is thereby quickly and easily replaced as desired in case of wear or need for guide blocks having different sidewall profiles for a desired grinding wheel angle.

In addition, to effect both vertical and horizontal adjustment, e.g., for different sizes and types of tools being sharpened, the guide block **60** is also bodily adjustable within channel **74**. The rocker arm **72** is shown pivotally secured intermediate its opposite ends by a pivot pin **78** extending laterally through the rocker arm **72** and secured to opposite sidewalls **80**, **82** of the channel **74**.

The pivot pin **78** extends through an oversized opening **84** formed between the opposite ends of the rocker arm **72**, and a pair of vertical adjusting screws **86**, **88** extend down through the rocker arm **72** on opposite sides of the pivot pin **78** in threaded engagement with the rocker arm **72**. Inner ends of each adjusting screw **86**, **88** bear against the floor **76** of the channel **74**. The rocker arm **72** is thus maintained in spaced relation to the channel **74** by the pivot pin **78** while being readily set in different selected vertical positions by adjusting screws **86**, **88**. To provide horizontal adjustment of the rocker arm **72**, a pair of locking screws **90** and **92** are threadably connected to each sidewall **80**, **82** of the channel **74** with the screws **90**, **92** disposed on opposite sides of the pivot pin **78** and in alignment with the corresponding screws on the opposite sidewall of the channel **74**.

Accurate placement of the guide block **60** is effected by simply loosening the adjusting screws **86**, **88** and the locking screws **90**, **92**, manipulating the rocker arm **72** to a desired position and then tightening the screws against the floor **76** of the channel **74** and the rocker arm **72** to firmly clamp it in a selected oriented position.

Referring now to the embodiment of this invention shown in FIG. 4, like numbers preceded by the numeral one are used to identify like parts.

An elongated blade guide **160** is mounted between grinding wheels **120** and **122** which are supported on frame **112** and power driven in opposite angular directions substantially as described in connection with the previous embodiment. A mounting bracket **194** is shown bolted to the frame **112** with the blade guide **160** received for vertical sliding movement within a guideway **196** formed by a channel member **198** integral with the mounting bracket **194**.

To effect adjustment of blade guide **160** to accommodate worn grinding elements, e.g., an adjusting screw **200** is threadably connected to a projecting portion **202** of the mounting bracket **194** and extends upwardly for connection to the bottom end of blade guide **160**. It will be understood that a suitable connection is made whereby adjusting screw **200** effects reciprocating vertical movement of the blade guide **160** while at the same time being freely rotatable relative thereto to position the blade guide **160** in desired vertical adjustment. Once positioned in relation to the grinding wheels **120**, **122**, the blade guide **160** is secured by a thumb screw **204** threadably connected to the channel member **198** to extend into the guideway **196** and clamp blade guide **160** relative to the mounting bracket **194**.

By virtue of the above described structure, the honing machine of this invention is particularly suited to accommodate wear of the various contact surfaces and to provide for ready interchangeability of parts which is facilitated by the adjustability of the bearing members for the grinding and drive wheels. The simplified rolling friction drive arrangement virtually eliminates service and maintenance problems. In addition to effecting a precision ground edge on cutting tools of various types, the machine is of exceptionally compact and durable construction and is quick and easy to adjust from an operating side of the machine for different job requirements.

As will be apparent to persons skilled in the art, various modifications and adaptations of the structure above described will become readily apparent without departure from the spirit and scope of the invention, the scope of which is defined in the appended claims.

I claim:

1. A machine for honing an edge cutting tool and comprising a frame, a pair of grinding wheels mounted on the frame and having peripheral edge portions in spaced alignment, a U shaped channel secured to the frame between the axes of the grinding wheels, an elongated rocker arm received within the channel and having one end disposed between the grinding wheels, a tool guide mounted on said one end of the rocker arm and interposed between the grinding wheels, the tool guide having on opposite sides thereof a flat sidewall surface adjacent each of the grinding wheels and jointly defining with peripheral edge portions thereof a pair of generally V shaped tool receiving slots, opposite sidewall surfaces of the tool guide providing supporting surfaces for opposite sides of a tool upon drawing it alternately through each of the tool receiving slots, and releasable adjusting means for selectively clamping the rocker arm within the channel with the tool guide adjustably positioned relative to the grinding wheels, the grinding wheels being power driven in opposite angular directions with each of the grinding wheels being directed from a cutting edge toward an opposite edge of a tool positioned in the adjacent tool receiving slot.

2. The machine of claim **1** wherein the grinding wheels are laterally adjustable in peripheral alignment.

3. The machine of claim **1** wherein the grinding wheels are mounted on a pair of parallel shafts, and wherein driving means are provided including an electric motor having an output shaft disposed in parallel relation to the grinding wheel support shafts, a second pair of shafts supporting a pair of drive wheels for rotation with the drive wheels in external contact with one another, one of the drive wheels being connected to the motor output shaft, and a driving connection between each of the grinding wheel support shafts and one of the drive wheel support shafts for driving the grinding wheels in opposite angular directions.

4. The machine of claim **1** further including a pivot pin extending laterally through the rocker arm and having opposite ends secured to sidewalls of the U shaped channel, the rocker arm carrying a pair of vertical adjusting screws on opposite sides of the pivot pin, the adjusting screws being threadably connected to the rocker arm and engageable with a floor of the U shaped channel, the channel having a plurality of clamping screws on the sidewalls thereof for engaging opposite sides of the rocker arm and maintaining the tool guide in adjusted relation to the grinding wheels.

5. The machine of claim **3** further including a solid rubber take-off drive wheel mounted on the motor output shaft in direct peripheral engagement with said one drive wheel.

6. A machine for honing an edged cutting tool and comprising a frame, a pair of grinding wheels mounted on the frame in spaced alignment, a tool guided interposed between the griding wheels, and adjustable mounting means on the frame for fixing the tool guide in preselected adjusted position between the grinding wheels, the mounting means including an elongated arm pivotally supported relative to the frame for vertical adjustment between the grinding wheels, and releasable clamping means maintaining the arm against unintended movement relative to the frame with the tool guide in a preselected adjusted position.

7. The machine of claim **6** further including a U shaped channel secured to the frame between the axes of the grinding wheels, the elongated arm of the tool guide mounting means being pivotally supported within the channel and having one end disposed between the

grinding wheels for holding the tool guide therebetween in a preselected adjusted position.

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