A device for edging stone which is adapted for attachment to a standard wet stone polisher. The device comprises a plate-like housing for squaring the stone polisher with the edge of the stone surface, means for ejecting water or air onto the stone surface, and stoppers for adjusting the depth that the polisher cuts into the stone.
IMPROVED EDGER FOR STONE, GRANITE, MARBLE AND THE LIKE

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a device for edging stone materials which is adapted for attachment to a rotary stone polishing tool.

[0002] There are a number of tools for cutting, shaping, and polishing stone, granite, marble, and the like (hereinafter collectively referred to as "stone"). One such tool is an edger which generally comprises a rotating shaft adapted for combination to various bits. Edgers are primarily used to shape, finish, and profile the edges of slab stone articles, such as counter tops, using differently shaped bits. The process of edging a piece of rough stone is similar to sanding a rough piece of wood in that smoothing and shaping the edge of the stone requires a number of different bits used in succession beginning with a coarse bit and ending with a smooth bit.

[0003] There are several different kinds and sizes of stone edgers that have been used in the art. One such edger is for shaping the edge of a stone countertop. This edger comprises a housing having an internal electric motor with a bit extending below the surface of the housing. In use, the housing rests on the level counter surface while the motor spins the bit and the user guides the bit along the edge of the counter surface smoothing and shaping the edge of the stone counter. The problem with this type of edger is that the internal motor makes it heavy and difficult to transport and maneuver over the counter surface. Further, the weight of the edger’s motor causes friction between the lower surface of the housing and the stone countertop as the device moves across the countertop. The friction can cause scratches in the stone’s surface. Another problem with this type of edger is that it is relatively expensive to purchase and maintain because of the many moving parts that comprise the gears and internal motor.

[0004] Another device known in the art that can be used as an edger is called a stone polisher. Stone polishers are known in the art as an essential tool for stone workmen. A stone polisher is a small hand tool comprising a rotating shaft able to combine with various bits for etching, polishing, and cutting slab materials such as stone. Stone polishers can be powered pneumatically, electrically, or by any other suitable means. The problem with using a stone polisher as an edger is that stone polishers do not have housings or other guides for aligning and squaring them with the stone. This makes it difficult to form consistent cuts and profiles in stone edges because the angle of the stone polisher relative to the stone’s edge is hard to keep consistent. This can lead to more time spent by the stone workman, which means more expense to finish the stone product.

[0005] Therefore, there is a need for a stone edging device that is light weight, easy to use, easy to align with the stone surface, inexpensive, and provides precise edging on stone substrates.

SUMMARY OF THE INVENTION

[0006] The present invention is an edging device that comprises a plate which is adapted for attachment to a standard stone polisher. The plate has a top side and a bottom side. The stone polisher is combined with the plate so that the rotating shaft of the polisher extends downward beyond the plane of the plate bottom side. The plate top side has a handle to aid the user in guiding the device over the stone surface and an inlet port adapted for combining the device to a water or air source. The inlet port is in communication with a plurality of holes on the plate bottom side. The holes are adapted to inject the water or air onto the stone surface. The ejected water or air helps to reduce scratches on the stone that may be caused by the plate.

[0007] The device has several features which help to align the polisher with the stone’s edge. First, the plate maintains the bit of the polisher at a consistent and proper angle relative to the stone because the majority of the plate’s surface area rests level with respect to the stone’s surface. Second, the plate serves to align the elevation of the bit relative to the stone’s edge because the polisher and plate are always combined at the same relative height. Third, the plate bottom side comprises stoppers which serve to ensure the rotating bit of the polisher cuts into the stone at a consistent and desired depth.

[0008] In use, after the stone polisher is combined with the plate, and after a bit is combined with the shaft of the stone polisher, the device is moved along the edge of a stone surface causing the polisher’s rotating bit to contact the edge of the stone surface. The device of the present invention provides a light weight, easy to use edging tool that is relatively inexpensive since most stone workmen already own a stone polisher.

BRIEF DESCRIPTION OF THE DRAWING

[0009] FIG. 1 is a top perspective view of the attachment device of the present invention;

[0010] FIG. 2 is a view of the bottom side of the attachment device of the present invention with the stone polisher shown in phantom lines;

[0011] FIG. 3 is an elevational view of the attachment device with the stone polisher shown in phantom lines;

[0012] FIG. 4 is a perspective view of an alternate embodiment wherein the opening is near the center of the plate;

[0013] FIG. 5 is a side view showing the bit adapter nut with the stone polisher in phantom lines; and

[0014] FIG. 6 is a top view showing the bifurcated ends of the collar and the flange at the lower end of the opening.

DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE INVENTION

[0015] The present invention is an edger attachment device for combination with a standard stone polisher 18. As seen in FIGS. 1 and 2, the present invention comprises a plate 10 having a top side 10a and a bottom side 10b, respectively. In the preferred embodiment, the plate top side 10a is comprised of metal covering and the plate bottom side 10b is comprised of plastic because plastic is less likely to scratch the stone’s surface 22.

[0016] As seen in FIGS. 1 and 4, the plate 10 comprises an opening 12 for attachment to the stone polisher 18. The stone polisher 18 is inserted into opening 12 until the
polisher 18 rests against flange 25 near the bottom of the opening 12. The flange 25 ensures the stone polisher 18 is combined with the plate 10 at a consistent relative height so that the polisher 18 can be removed and reattached to the plate 10 in the same position. FIG. 1 shows a first embodiment wherein the opening 12 of the plate 10 is located near a first end of the plate 10. Since the majority of the plate’s 10 surface area is located away from the opening 12, the plate 10 counterbalances the weight of the stone polisher 18 and the plate 10 remains level with respect to the stone surface 22. A handle 14 is positioned on the top portion of the plate 10 thereby allowing the user to firmly press down on the handle 14 to ensure that the plate 10 remains level on the stone surface 22 even though the stone polisher 18 is hanging off the edge of the stone surface 22 near the plate 10 first end.

[0017] FIG. 4 shows an alternate embodiment wherein the opening 12 is located near the center portion of the plate 10. This embodiment enables the device to be used on the inside edges of openings cut in stone, such as an opening adapted to receive a sink or other plumbing fixture. In this embodiment, the opening 12 is located near the center of the plate 10 to allow a sufficient surface area of the plate 10 to contact and remain level with the stone surface 22 while the polisher 18 shapes and edges around the sink opening. As seen in FIG. 4, this embodiment preferably comprises multiple handles 14 for better control of the plate 10. Although not shown in FIG. 4, the elements and features of the first embodiment shown in FIGS. 1-3, 5, and 6 may also be used in this center-hole embodiment.

[0018] As shown in FIG. 6, the opening 12 has a collar 13 with a first and second bifurcated end 17, 19. The bifurcated ends 17, 19 are adapted to move toward and away from each other thereby decreasing and increasing the radius of the collar 13, respectively. The bifurcated ends 17, 19 are moved toward and away from each other by a screw 15 that is threaded through both bifurcated ends 17, 19, however, it should be understood that the bifurcated ends could be moved by any other suitable means. In use, a standard stone polisher 18 (shown in phantom lines in FIGS. 2 and 3) is combined with the plate 10 by inserting the stone polisher 18 into the opening 12. The screw 15 is then tightened thereby moving the bifurcated ends 17, 19 closer together and decreasing the radius of the collar 13 and corresponding opening 12. The collar 13 tightens around the stone polisher 18 thereby securely combining the polisher 18 with the plate 10.

[0019] In addition to the flange 25 described above, the device of the present invention has several features for aligning the bit 20 of the polisher 18 with the stone’s edge 50. First, the plate 10 squares the polisher 18 to the stone’s edge 50 because a sufficient surface area of the plate 10 contacts the stone surface 22 so that the plate 10 is level with respect to the surface of the stone 22. The polisher 18 is inserted into opening 12 as described above so that the polisher’s shaft 30 extends downward at a generally ninety degree angle relative to the plane of the plate 10, thereby making the polisher’s shaft 30 square with respect to the stone’s edge 50.

[0020] In addition, FIGS. 2 and 3 show the stoppers 34 on the bottom side of the plate 10. The stoppers 34 allow the user to adjust the depth at which the bit 20 cuts into the stone 22. The stoppers 34 are mounted onto shafts which are movable along the length of the slots 35 so the user can adjust the depth of cut that is made into the stone 22 with the bit 20. Typically, the stoppers 34 are positioned so that they contact the stone’s edge 50 just behind the bit 20. This allows the bit 20 to make contact with the stone’s edge 50 without penetrating too deeply into the stone 22. However, if the stone’s edge 50 is extremely uneven or otherwise not desirable, the user may set the stoppers 34 so the bit 20 is allowed to penetrate more deeply into the stone 22.

[0021] In the preferred embodiment, the shafts are bolts which can be hand tightened by fasteners 36 extending from the slots 35 on the plate 10. The fasteners 36 can be wing nuts, “I” shaped bolts, or any other suitable fastening means. In addition to preventing the user from cutting too deeply into the stone 22, the stoppers 34 also comprise a bearing or rotational ring 37 which is adapted to rotate. The bearings or ring 37 rotates against the stone surface 22 as the user moves the device along the stone’s edge 50 to provide a smooth motion for the device at a consistent stone cutting depth.

[0022] As shown in FIG. 1, the plate top side 10a has an inlet port 16a for collecting the water to which the device is connected. The inlet port 16a is connected to a water source. The inlet port 16a also has a main water valve 21 for turning the water on/off. As shown in FIG. 2, the plate bottom side 10b has a plurality of holes 32 which are in communication with the plate top portion 16a for ejecting water and/or air onto the stone surface 22. The plate top side 10a and plate bottom side 10b are spaced apart to form a chamber for water to flow through. The ejection of the water or air from the holes 32 allows the plate 10 to glide on a water film or an air pocket formed between the plate bottom side 10b and the stone surface 22. This helps to reduce scratches on the stone surface that may be caused by the plate 10 as well as expel stone debris out from under the plate 10.

[0023] Also in communication with the water inlet port 16 is a nozzle 40 as shown in FIG. 2. The nozzle 40 is for ejecting water directly onto the bit 20. The nozzle 40 has a valve 23 for turning the water flow on/off. The valve 23 is preferably located down stream from main water valve 21 so that water can be supplied to the plurality of holes 32 by turning main water valve 21 “on”, while valve 23 is turned “off” thereby restricting the flow of water to nozzle 40. The nozzle 40 receives water from the water inlet port 16 and expels it onto the bit 20 for cooling the bit 20 and for keeping the bit 20 free from debris.

[0024] In an alternate embodiment, water can be received directly into the stone polisher 18 and expelled through the bit 20, as shown in FIG. 5. In this embodiment, water is received into the stone polisher 18 and directed through the end of the shaft 30 and into bolt 44. Bolt 44 has an opening 31 in its end for receiving the water. Bolt 44 also has a plurality of holes through which water is expelled toward the inside of the bit 20. Bit 20 also has a plurality of holes through which the water is expelled onto the stone surface 22. If water ejection through the bit 20 is not desired, a bolt 44 may be used that does not have the plurality of holes. This prevents water from being ejected out of the bit 20 and onto the stone 22 as described in this paragraph.

[0025] As shown in FIG. 5, the bit 20 is attached to the stone polisher 18 by screwing a fastener bolt 44 upward
through the center of the bit 20, as is known in the art. A bit adapter 42 is placed between the stone polisher 18 and the bit 20 to place the bit 20 at its proper height. The present invention has no means for adjusting the height of the bit 20 relative to plate 10 other than changing the size of the bit adapter 42. As discussed in the “Background” section of this specification, it is usually necessary to use several bits 20 when edging a rough stone surface, beginning with a rough bit and ending with a smooth bit. It is necessary that as the user changes the bits, the successive bits remain at the same height relative to the plate 10 and stone’s edge. The system comprises a number of bit adapters 42 which differ for each different edge profile, such as one adapted for the succession of bull nose bits, one for ogee bits, etc. . . .

[0026] In use, the present invention is first combined with a standard stone polisher 18 by securing the stone polisher 18 to the collar 13 of the plate 10. A bit 20 is attached to the shaft 30 of the stone polisher 18 and the plate 10 is placed on a stone surface 22 which squares the bit 20 with the stone’s edge 50. The stone polisher 18 is actuated causing the bit 20 to rotate. The user guides the plate 10 along the plate’s edge 50 using the handle 14. The stoppers 34 allow the bit 20 to grind and/or polish the stone 22 at a consistent depth with the while rotating as the user moves the plate 10 to allow the plate 10 to move smoothly along the stone’s edge 50. Water or air may be introduced through port 16 and expelled onto the stone surface 22 through holes 32, and/or expelled onto the rotating bit 20 through nozzle 40. The user can change bits 20 and achieve a consistent cut using the second bit as long as the user uses the same bit adapter 42.

[0027] Having thus described the invention in connection with the preferred embodiments thereof, it will be evident to those skilled in the art that various revisions can be made to the preferred embodiments described herein with out departing from the spirit and scope of the invention. It is my intention, however, that all such revisions and modifications that are evident to those skilled in the art will be included with in the scope of the following claims.

What is claimed is:

1. A device adapted for combination to a standard stone polisher wherein the polisher has a removable bit for grinding and polishing the edge of a stone surface, said device comprising:

   a plate having a top side and a bottom side, said plate bottom side adapted for contacting the stone surface so as to align the device with the stone’s edge;

   an opening in the plate adapted to receive the stone polisher so that the bit extends below the surface of the plate bottom side.

2. The device of claim 1 further comprising an inlet port combined with the plate and adapted to receive water or air from an external source; and

   a plurality of openings on the plate bottom side in fluid communication with the inlet port;

   wherein the plurality of openings are adapted to expel the water or air received form the inlet port onto the stone surface.

3. The device of claim 2 wherein the device further comprises a nozzle extending from the plate bottom side, said nozzle in fluid communication with the inlet port so as to direct fluid onto the polisher bit.

4. The device of claim 1 wherein the plate further comprises adjustable stoppers extending below the surface of the plate bottom side, said stoppers adapted to be engagable with the edge of the stone so as to provide a predetermined depth of cut of the polisher bit into the stone.

5. The device of claim 4 wherein the adjustable stoppers are rotatable.

6. The device of claim 1 wherein the device further comprises a collar around the opening; and

   wherein the collar has a first member and a second member, said members moveable toward and away from each other between a first position in which the stone polisher is affixed to the plate and a second position is which the stone polisher is removable from the plate.

7. The device of claim 6 further comprising a bore through both the first and the second members; and a threaded member having a first end and a second end, said threaded member passing through the bore with said threaded member first end being threaded into one of the members so that rotation of the threaded member causes the threaded member to move the first and second members closer together and farther apart.

8. The device of claim 1 wherein the plate top side further comprises a handle.

9. The device of claim 1 wherein the water inlet port has an on/off valve for starting or stopping the flow of water through the device.

10. The device of claim 1 wherein the opening further comprises a flange for aligning the stone polisher.

11. The device of claim 1 wherein the plate top side has a first end, a second end, and a middle portion, and the opening is located near the plate first end.

12. The device of claim 1 wherein the plate top side has a first end, a second end, and a middle portion, and the opening is located near the plate middle portion.

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