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ROLLER ASSEMBELY FOR SHARPENING A KNIFE

Abstract

A roller assembly for sharpening a knife, comprising a cylindrical body and a plurality of surface treatment sections positioned on a first lateral side and a second lateral side of the cylindrical body. Each surface treatment section coupled with the cylindrical body through individual one or more connecting elements. Each surface treatment section providing different degrees of surface treatment to the target surface including coarse grinding, fine grinding, buffing and honing. The two guide elements rotate in synchronization with a sliding movement of the roller assembly along a pitch axis of the cylindrical body. The roller assembly is adapted to provide various surface treatment to sharpening objects.

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Background/Summary

[0001] BACKGROUND

Field of the Invention

[0002] The present disclosure relates to a roller assembly for providing surface treatment to a sharpening object such as knife. More particularly, the present disclosure relates to a roller assembly to provide various surface treatments to sharpening object such as grinding, buffing and honing to sharpening object such as knife.

Description of the Related Art

[0003] In conventional roller for knife sharpeners a user typically needs to use one hand to hold the roller and use the other hand to hold the knife. This other hand must then slide the knife to be sharpened back and forth along the sharpening stone. This can sometimes present a potentially dangerous situation, especially for inexperienced users of such sharpening devices. Therefore, there remains a need for a new and improved design for a knife sharpener to overcome these types of potential problems and situations. Other disadvantages, inconveniences, and issues also exist with current sharpeners and sharpening methods, which includes the inaccuracy of knife sharpening angle.

[0004] U.S patent application “US20230405767A1” discloses a sharpening apparatus including a first cylindrical body and a second cylindrical body. The second cylindrical body defining a bore extending from the first cylindrical bore end and a second cylindrical bore end. A first wheel stem engaging the first shaft bore and a second wheel stem engaging the second shaft bore.

[0005] In such rollers, it is difficult to achieve the various surface treatments to obtain different surface properties.

[0006] Alternative approaches to such rollers are desired. So, there is a need for a roller assembly that includes variable surface treatment sections to obtain different surface treatments effectively.

SUMMARY

[0007] It is an object of the present disclosure to provide a roller assembly for sharpening a knife.

[0008] It is an object of the present disclosure to provide various surface treatments such as grinding, buffing and honing to sharpening object such as knife.

[0009] Another object of the present disclosure is to provide various surface treatments to sharpening object at desired angle.

[0010] Further, a roller assembly is desired which is easier to handle and can be used for providing various surface treatments.

[0011] Accordingly, there is provided a roller assembly comprising a cylindrical body and a plurality of surface treatment sections. The cylindrical body serves as a central component, designed in a substantially cylindrical shape to ensure a stable structure for the entire assembly. A first and second lateral side of the cylindrical body are designed to accommodate a guide element.

[0012] Further, each corner of the lateral peripheral side of the cylindrical body is equipped with a peripheral groove at a peripheral edge which serves to position the guide element effectively.

[0013] According to an aspect of the present disclosure, the cylindrical body can be manufactured using a variety of suitable materials such as wood, stone, or metal, depending on the intended application and desired properties of the roller assembly.

[0014] According to another aspect of the present disclosure, a guide element can be a circular or substantially circular structure. However, in alternate embodiments, the guide element has the flexibility to adopt various shapes such as of an elongated shapes, polygonal configuration, oval, square, triangular, heart, or any other configuration known in the art.

[0015] According to another aspect of the present disclosure, an intermediate ring is included to aid in the rotation of the guide element in relation to the work surface. The intermediate ring possesses a central hole that accommodates one or more connecting elements. It can be constructed from various materials, including metal or any other appropriate material. The intermediate ring serves to protect the guide element from abrasion caused by any of the surface treatment sections.

[0016] According to an aspect of the present disclosure a cylindrical body is provided with the first lateral side and the second lateral side. Both the lateral sides of the cylindrical body are equipped with a plurality of surface treatment sections. Each of these surface treatment sections serves a distinct purpose, providing different surface properties. The surface treatment sections are attached to create the desired surface property according to the process requirement. Each surface treatment section is coupled with the cylindrical body through individual one or more connecting elements. The connecting elements may be selected from screws or nails.
[0017] Each surface treatment section has a substantially semi-circular shape so as to make a substantially complete circle when attached at the first and the second lateral side of the cylindrical body. Each surface treatment section holds a different surface property to provide a different degree of surface treatment of the target surface in order to impart different characteristics to the target surface. Different degrees of surface treatment to the target surface including but not limited to coarse grinding, fine grinding, buffing and honing.
[0018] According to yet another aspect of the present disclosure an apparatus for sharpening a knife comprises a holding element for holding the knife and the roller assembly. The holding element comprises a holding surface and an angle changing mechanism. The holding surface is a magnetic surface and allows the magnetic coupling of the knife to holding element. The angle changing mechanism is configured to change an angle of the holding surface. A scale is placed at outer face of angle changing mechanism to assist the user in accurately choosing the desired angle for sharpening the knife edges.
[0019] According to another aspect of the present disclosure during the sharpening process, the knife to be sharpened is securely held in the holding element. The desired angle of sharpening is determined by adjusting the angle adjusting mechanism. The edge of knife is positioned towards the surface treatment section of the roller assembly. To sharpen the knife, the user can grip the cylindrical body and slide it along the pitch axis. This motion allows the knife's edge to come into contact with the surface section, effectively sharpening it.
[0020] According to an aspect of the present disclosure, the cylindrical body of roller assembly, is of an elongated cylindrical configuration. However, in alternate embodiments, the cylindrical body may be of an elongated square, polygonal configuration, oval, triangular, heart, or any other configuration known in the art.
[0021] According to an embodiment of the present disclosure, the cylindrical body **101** may be made of a rigid material like wood or hard plastic any other material known in the art. However, in alternate embodiments, the cylindrical body may be made of metal material.
[0022] According to an embodiment of the present disclosure, the guide element may be made of hard or soft plastic, preferably hard plastic material. The first surface treatment section is preferably a coarse grind stone, and the second surface treatment section is preferably a fine grind stone. The third surface treatment section is preferably a leather or a leather coated surface. The fourth surface treatment section is a metallic surface preferably leather steel or steel coated.
[0023] The present disclosure is not limited to, the broadest in accordance with the basic idea disclosed herein. It should be interpreted as having a range. Skilled artisans may implement the pattern of the non-timely manner by combining, replacement of the disclosed embodiments shape, this would also do not depart from the scope of the disclosure. In addition, those skilled in the art may readily change or modify to the disclosed embodiments, based on the present specification, such changes or modifications also belong to the scope of the present disclosure will be apparent.

Description

BRIEF DESCRIPTION OF THE DRAWINGS
[0024] A more complete appreciation of the present disclosure and many of the attendant

advantages thereof will be readily obtained as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings, wherein:

[0025] FIG. **1**A illustrates a perspective view of roller assembly for sharpening a knife of a prior art;

[0026] FIG. **1**B illustrates another perspective view of roller assembly of FIG. **1** of a prior art;

[0027] FIG. **2** illustrates a perspective view of a roller assembly according to a preferred embodiment of the present disclosure;

[0028] FIG. **3** illustrates another perspective view of the roller assembly of FIG. **2**;

[0029] FIG. **4** illustrates an exploded view of the roller assembly of FIG. **2**;

[0030] FIG. **5** illustrates a cross-sectional view of the roller assembly of FIG. **2**;

[0031] FIG. **6***a* illustrates a perspective view of a cylindrical body of FIG. **2**;

[0032] FIG. **6***b* illustrates a perspective view of a guide element of FIG. **2**;

[0033] FIG. **6***c* illustrates a perspective view of a connecting element of FIG. **2**;

[0034] FIG. **7**A illustrates a perspective view of a buffing element of FIG. **2**;

[0035] FIG. **7**B illustrates a perspective view of a fine grinding element of FIG. **2**;

[0036] FIG. **7**C illustrates a perspective view of a honing element of FIG. **2**;

[0037] FIG. **7**D illustrates a perspective view of a coarse grinding element of FIG. **2**;

[0038] FIG. **8** illustrates a perspective view of an apparatus for sharpening according to second embodiment of present disclosure;

[0039] FIG. **9** illustrates a perspective view of a holding element of FIG. **2**;

DETAILED DESCRIPTION

[0040] As shown throughout the drawings, like reference numerals designate like or corresponding parts. While illustrative embodiments of the present disclosure have been described and illustrated above, it should be understood that these are exemplary of the disclosure and are not to be considered as limiting. Additions, deletions, substitutions, and other modifications can be made without departing from the spirit or scope of the present disclosure. Accordingly, the present disclosure is not to be considered as limited by the foregoing description.

[0041] Throughout this specification, the terms “comprise,” “comprises,” “comprising” and the like, shall consistently mean that a collection of objects is not limited to those objects specifically recited.

[0042] In the prior art, FIGS. **1**A and **1**B depict a roller assembly used for sharpening cutting tools such as kitchen and household knives. This roller can be manually manipulated or rolled along a surface to sharpen the tools. However, it has limited usability because it only has one type of surface treatment section at each end of the roller. Furthermore, this sharpening apparatus requires the user to rotate the roller while applying force against the surface being treated. This means that the user needs to exert more gripping force to effectively use the roller with the surface treatment plates. In summary, the roller assembly described in the prior art has limitations in terms of its usability for different surface treatments, and it requires the user to exert more force while using it.

[0043] FIGS. **2** to **5**, shows an illustrative roller assembly **100** in accordance with the present disclosure, which is designed for sharpening, grinding, buffing, and/or honing of cutting tools. The sharpening apparatus **100** is a handheld device that can be manually manipulated across a work surface.

[0044] The roller assembly **100** comprises a cylindrical body **101** and a plurality of surface treatment sections **120**. The cylindrical body **101** serves as a central component, designed in a substantially cylindrical shape to ensure a stable structure for the entire assembly. A first and second lateral side of the cylindrical body **101** are designed to accommodate a guide element **130**. Each corner of the lateral peripheral side of the cylindrical body **101** is equipped with a peripheral groove **132** at a peripheral edge **106** which serves to position the guide element **130** effectively. The cylindrical body **101** can be manufactured using a variety of suitable materials such as wood, stone,

or metal, depending on the intended application and desired properties of the roller assembly **100**.
[0045] Referring to FIG. **6***b*, the guide element is illustrated according to the present disclosure. The guide element **130** can be a circular or substantially circular structure. However, in alternate embodiments, the guide element **130** has the flexibility to adopt various shapes such as of an elongated shapes, polygonal configuration, oval, square, triangular, heart, or any other configuration known in the art. The guide element **130** comprises at least three distinct surfaces including an outer peripheral surface **135**, an inner peripheral surface **133** and a lateral peripheral surface **134**. The inner peripheral surface **133** and the outer peripheral surface **135** encloses the lateral peripheral surface **134**. Each of these surfaces serves a unique purpose in guiding the movement or positioning of the roller assembly. By utilizing the inner peripheral surface **133** and the lateral peripheral surface **134**, the guide element **130** can be conveniently coupled or integrated with the cylindrical body of the device. However in alternate embodiment, peripheral protrusions may be incorporated along its surfaces. These protrusions are provided to ensure to firmly grip the lateral groove **132** of the cylindrical body **101**, ensuring a secure and reliable connection. The inner peripheral surface **133** encloses a cavity **131** to allow the exposure of lateral surface of the cylindrical body.
[0046] The lateral peripheral surface **134** of guide element **130** is suitable to couple with an outer peripheral edge **106** of the cylindrical body **101**. The outer peripheral edge **106** of the cylindrical body **101** has reduced diameter than the cylindrical body **101**. The outer peripheral edge **106** is suitable to couple with the peripheral groove **137** formed between the outer peripheral surface **132** and the inner peripheral surface **133**.
[0047] Referring to FIG. **4**, an intermediate ring **150** is included to aid in the rotation of the guide element **130** in relation to the work surface. The intermediate ring **150** is a thin plate that features a circular hole in its center. Its main purpose is to ensure the secure fastening of the guide element **130**. Additionally, the intermediate ring **150** possesses a central hole that accommodates one or more connecting elements **102**. It can be constructed from various materials, including metal or any other appropriate material. The intermediate ring **150** serves to protect the guide element from abrasion caused by any of the surface treatment sections.
[0048] Further referring to FIGS. **1** to **6**, the first lateral side **111** and the second lateral side **112** of the cylindrical body **101** are equipped with a plurality of surface treatment sections **121**, **122**, **123**, and **124** that are securely attached at both the ends of the cylindrical body. Each of these surface treatment sections **121**, **122**, **123**, and **124** serves a distinct purpose, providing different surface properties. The surface treatment sections **121**, **122**, **123**, and **124** are attached to create the desired surface property according to the process requirement. Each surface treatment section **121**, **122**, **123**, and **124** coupled with the cylindrical body **101** through individual one or more connecting elements **102**. The connecting elements **102** may be selected from screws or nails. The connecting elements **102** pass through the holes **170** and engage with the grooves **107** of the cylindrical body.
[0049] Each surface treatment sections **121**, **122**, **123**, and **124** has a substantially semi-circular shape so as to make a substantially complete circle when attached at the first and the second lateral side **111**, **112** of the cylindrical body **101**. Each surface treatment section **121**, **122**, **123**, and **124** holds a different surface property to provide a different degree of surface treatment of the target surface in order to impart different characteristics to the target surface. Each surface treatment section **121**, **122**, **123**, and **124** is provided with a hole **170** in the center in order to be engaged with the cylindrical body (**101**) by means of the connecting elements (**102**). Each surface treatment section **121**, **122**, **123**, and **124** is provided with at least two faces comprising a front face **121***a* and a rear face **121***b*.
[0050] The surface treatment section **121** comprises the first face **121***a* exposing outward to the user and is configured to coarse grind the target surface, and the rear face **121***b* facing inward towards the cylindrical body and not exposed to the user (not shown in FIGS). The first face **121***a* is equipped with the first surface treatment section **121**, which is configured to coarse grind the

target surface.
[0051] The second surface treatment section **122** comprises a first face **122***a* exposing outward to the user and is configured to coarse grind the target surface, and a rear face **122***b* facing inward towards the cylindrical body and not exposed to the user (not shown in FIGS). The first face **122***a* is equipped with the second surface treatment section **122**, which is configured to fine grind the target surface.
[0052] The third surface treatment section **123** comprises a first face **123***a* exposing outward to the user and is configured to coarse grind the target surface, and a rear face **123***b* facing inward towards the cylindrical body and not exposed to the user (not shown in FIGS). The first face **123***a* is equipped with the third surface treatment section **123**, which is configured to buff the target surface.
[0053] The fourth surface treatment section **124** comprises a first face **124***a* exposing outward to the user and is configured to coarse grind the target surface, and a rear face **124***b* facing inward towards the cylindrical body and not exposed to the user (not shown in FIGS). The first face **124***a* is equipped with the second surface treatment section **124**, which is configured to hone the target surface.
[0054] Each surface treatment sections **121**, **122**, **123**, and **124** being a substantially semi-circular structure forms a radial arc **171** at upper end and a planar surface **172** at lower end. Each face is configured to accommodate at least two surface treatment sections **121**, **122**, **123**, and **124** to make a substantially complete circle exposed to the user.
[0055] Each end facing outwards from the cylindrical body **101** for performing a different surface treatment of a target surface. Each surface treatment section is configured to provide different degrees of surface treatment to the target surface including but not limited to coarse grinding, fine grinding, buffing and honing.
[0056] During a surface treatment process the guide elements **130** are positioned to be in contact with a surface (e.g., table). The at least two guide elements **130** are positioned to allow the cylindrical body **101** along with the plurality of surface treatment sections to slide smoothly along the surface. The at least two guide elements **130** rotate, along a pitch axis X of the cylindrical body **101**, in synchronization with a sliding movement of the roller (refer FIG. **2**). This ensures that as the roller slides the cylindrical body **101** and its surface treatment sections, remains stationary along the pitch axis of the cylindrical body **101**. Rotation of both guide elements **130** and therefore knife/blade sharpening occurs when the user places this roller assembly on a generally planar surface and grips the cylindrical body **101** and therefore slides the cylindrical body.
[0057] Referring to FIGS. **8** and **9**, an apparatus for sharpening a knife is shown according to a second embodiment of the present disclosure. The apparatus **1000** comprises a holding element **400** for holding the knife and the roller assembly **100**. The holding element **400** comprises a holding surface **401** and an angle changing mechanism **500**. The holding surface **401** is a magnetic surface and allows the magnetic coupling of the knife to holding element. The angle changing mechanism is configured to change an angle of the holding surface **401**. The angle changing mechanism **500** is configured to change an angle of the holding surface between 5-45 degree allowing it for a wide range of sharpening angles. An angle changing mechanism **500** can change the angle with a very precision of 5 degree, ensuring accurate and precise sharpening of the knife edges at various angles. A scale **501** is placed at outer face of angle changing mechanism **500** to assist the user in accurately choosing the desired angle for sharpening the knife edges. An indicator is provided in the angle changing mechanism **500** to indicate the desired angle required for knife sharpening process.
[0058] During the sharpening process, the knife to be sharpened is securely held in the holding element **400**. The desired angle of sharpening is determined by adjusting the angle adjusting mechanism. The edge of knife is positioned towards the surface treatment section of the roller assembly **100**. To sharpen the knife, the user can grip the cylindrical body **101** and slide it along the

pitch axis. This motion allows the knife's edge to come into contact with the surface section, effectively sharpening it.
[0059] The roller assembly **100** (explained in detail under the description of FIGS. **2** to **7**) and the same is not explained in detail hereinafter for the sake of brevity.
[0060] The cylindrical body **101** may be made of a rigid material like wood or hard plastic any other material known in the art. However, in alternate embodiments, the cylindrical body **101** is made of metal material.
[0061] The guide element may be made of hard or soft plastic, preferably hard plastic material. The first surface treatment section is preferably a coarse grind stone, and the second surface treatment section is preferably a fine grind stone. The third surface treatment section is preferably a leather or a leather coated surface. The fourth surface treatment section is a metallic surface preferably leather steel or steel coated.
[0062] It will be understood that the foregoing is only illustrative of the principles of the disclosure, and that various modifications can be made by those skilled in the art without departing from the scope and spirit of the disclosure. For example, the shapes and/or sizes of various components can be different from the shapes and sizes shown herein. As another example, the materials used for various components can be different from those mentioned specifically herein.

Claims

1. A roller assembly for sharpening a knife, the roller assembly comprising: a cylindrical body; a plurality of surface treatment sections positioned on a first lateral side and a second lateral side of the cylindrical body; wherein each surface treatment section coupled with the cylindrical body through individual one or more connecting elements; wherein each surface treatment section having a surface treatment end facing outwards from the cylindrical body for performing surface treatment of a target surface; wherein each surface treatment section providing different degrees of surface treatment to the target surface including coarse grinding, fine grinding, buffing and honing; at least two guide elements; wherein each of the at least two guide elements being mounted adjacent to respective first and second lateral sides of the cylindrical body; wherein each of the two guide elements are rings positioned to run along peripheries of the respective first and second lateral sides of the cylindrical body; wherein the at least two guide elements are positioned to be in contact with a surface; wherein at least two guide elements allowing the cylindrical body to slide on the surface; wherein the at least two guide elements rotate in synchronization with a sliding movement of the roller assembly along a pitch axis of the cylindrical body; wherein during the sliding movement, the cylindrical body and its plurality of surface treatment sections remains stationary along the pitch axis of the cylindrical body.
2. The roller assembly according to claim 1, wherein the roller assembly includes a cylindrical body, connecting elements, surface treatment sections and guide elements.
3. The roller assembly according to claim 1, wherein the surface treatment section is coupled to the cylindrical body by connecting elements.
4. The roller assembly according to claim 1, wherein the connecting elements may be selected from screws or nails.
5. The roller assembly according to claim 1, wherein the cylindrical body may be made of wood, plastic or metal, preferably wood.
6. The roller assembly according to claim 1, wherein the cylindrical body may be made of wood, plastic or metal, preferably wood.
7. The roller assembly according to claim 1, wherein the connecting ring may be made of wood, plastic or metal, preferably wood
8. The roller assembly according to claim 1, wherein the guide element may be made of hard or soft plastic, preferably hard plastic material.

9. The roller assembly according to claim 1, wherein surface treatment sections are substantially semi-circular in shape so as to make a substantial circular shape in combination.
10. An apparatus for sharpening a knife, the apparatus comprising: a holding element; wherein the holding element comprises a holding surface for holding the knife; an angle changing mechanism; an angle changing mechanism; wherein angle changing mechanism configured to change an angle of the holding surface and; a roller assembly for sharpening a knife, the roller assembly comprising; a cylindrical body; a plurality of surface treatment sections positioned on a first lateral side and a second lateral side of the cylindrical body; wherein each surface treatment section coupled with the cylindrical body through individual one or more connecting elements; wherein each surface treatment section having a surface treatment end facing outwards from the cylindrical body for performing surface treatment of a target surface; wherein each surface treatment section providing different degrees of surface treatment to the target surface including coarse grinding, fine grinding, buffing and honing; at least two guide elements; wherein each of the at least two guide elements being mounted adjacent to respective first and second lateral sides of the cylindrical body; wherein each of the two guide elements are rings positioned to run along peripheries of the respective first and second lateral sides of the cylindrical body; wherein the at least two guide elements are positioned to be in contact with a surface; wherein at least two guide elements allowing the cylindrical body to slide on the surface; wherein the at least two guide elements rotate in synchronization with a sliding movement of the roller assembly along a pitch axis of the cylindrical body; wherein during the sliding movement, the cylindrical body and its plurality of surface treatment sections remains stationary along the pitch axis of the cylindrical body.
11. The apparatus according to claim 10, wherein holding element is a magnetic element.
12. The apparatus according to claim 10, wherein holding element is a magnetic element.
13. The apparatus according to claim 10, wherein angle can be adjusted between 5-45 degree with a precision of 5 degree.
14. The apparatus according to claim 10, wherein a scale is placed at outer face of angle changing mechanism to assist the user in accurately choosing the desired angle for sharpening the knife edges.
15. The apparatus according to claim 10, wherein to sharpen the knife, the user can grip the cylindrical body and slide it along the pitch axis.
16. The apparatus according to claim 10, wherein a holding surface provides the magnetic coupling of the knife to holding element.