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NAIL GRINDER

Abstract

A nail grinder includes: a housing, a master control module, a drive assembly, a nail grinding member, a power supply, and a display. The housing has a receiving cavity, and a cavity wall defines a first through opening communicating with to an exterior of the housing, a mounting structure is arranged on an outer surface of the housing. The master control module is received in the receiving cavity. The drive assembly is received in the receiving cavity and electrically connected to the master control module. The nail grinding member is at least partially exposed out of the receiving cavity and connected to the drive assembly. The drive assembly drives the nail grinding member to rotate. The power supply is received in the receiving cavity and electrically connected to the master control module. The display is mounted on the mounting structure and electrically connected to the master control module.

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Background/Summary

CROSS REFERENCE TO RELATED APPLICATION

[0001] The present application claims priority of the Chinese patent application No. 2024202899745, filed on Feb. 8, 2024, and contents of which are incorporated herein by its entireties.

TECHNICAL FIELD

[0002] The present disclosure relates to the field of nail manicuring, and in particular to a nail grinder.

BACKGROUND

[0003] An electronic nail grinder is a handy tool to grind a nail to keep a surface of the nail to be smooth. Compared to a traditional nail clipper, the electronic nail grinders may be used more conveniently and provide better grinding fineness.

[0004] The electronic nail grinder in the art may include a housing, a grinding head, a motor, and a battery. The motor drives the grinding head to grind the nail.

[0005] However, in this way, a user may not be aware of a state of the nail grinder, such as a rotation speed and a power level of the nail grinder, and the user may have a poor usage experience.

SUMMARY OF THE DISCLOSURE

[0006] The present disclosure provides a nail grinder to provide a better usage experience for the user.

[0007] In the present disclosure, a nail grinder is provided and includes: a housing, a master control module, a drive assembly, a nail grinding member, a power supply, and a display.

[0008] The housing has a receiving cavity. A wall of the receiving cavity defines a first through opening communicating with to an exterior of the housing, a mounting structure is arranged on an outer surface of the housing, and a cavity of the mounting structure is communicated with the receiving cavity. The master control module is received in the receiving cavity and disposed at a side of the mounting structure. The drive assembly is received in the receiving cavity and electrically connected to the master control module. The nail grinding member is at least partially exposed out of the receiving cavity and connected to the drive assembly through the first through opening, wherein the drive assembly is configured to drive the nail grinding member to rotate. The power supply is received in the receiving cavity and electrically connected to the master control module. The display is at least partially mounted on the mounting structure and electrically connected to the master control module.

[0009] According to the present disclosure, the display is disposed at the outside the housing by the mounting structure, such that the display is prevented from occupying a portion of the receiving cavity, and therefore, a larger space is available for receiving the battery, and the power capacity of the battery may be increased. A larger power capacity of the battery means that more electrical energy can be stored, and the operation endurance of the nail grinder can be prolonged. In addition, since increasing the power capacity, the user may use the nail grinder for a longer period of time without charging the nail grinder frequently, and the nail grinder may be more practical and may be used more conveniently.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Specific embodiments of the present disclosure will be described in further detail below by referring to the accompanying drawings and embodiments.

[0011] FIG. **1** is a perspective view of a nail grinder according to an embodiment of the present disclosure.
[0012] FIG. **2** is an assembled view of the nail grinder according to an embodiment of the present disclosure.
[0013] FIG. **3** is an enlarged view of a portion A in FIG. **2**.
[0014] FIG. **4** is a schematic view of a drive assembly, a master control module, and a battery of the nail grinder according to an embodiment of the present disclosure.
[0015] FIG. **5** is a cross-sectional view of a portion of a housing and a motor of the nail grinder according to an embodiment of the present disclosure.
[0016] FIG. **6** is an assembled schematic view of the housing and the motor of the nail grinder according to an embodiment of the present disclosure.
[0017] FIG. **7** is an assembled schematic view of the housing and the master control module of the nail grinder according to an embodiment of the present disclosure.
[0018] FIG. **8** is an assembled schematic view of the housing and the battery of the nail grinder according to an embodiment of the present disclosure.
[0019] FIG. **9** is an assembled schematic view of a charging port and the housing of the nail grinder according to an embodiment of the present disclosure.
[0020] FIG. **10** is an assembled schematic view of a nail grinding member and a drive assembly of the nail grinder according to an embodiment of the present disclosure.
[0021] FIG. **11** is an assembled schematic view of the nail grinding member and the housing of the nail grinder according to an embodiment of the present disclosure.
[0022] FIG. **12***a* is a perspective view of a grinding head having a conical body and a flat free end according to an embodiment of the present disclosure.
[0023] FIG. **12***b* is a perspective view of a grinding head having a round-disk shape according to an embodiment of the present disclosure.
[0024] FIG. **12***c* is a perspective view of a grinding head having a bullet shape according to an embodiment of the present disclosure.
[0025] FIG. **13** is an assembled schematic view of a collection cover and a connection base according to an embodiment of the present disclosure.
[0026] FIG. **14** is an assembled schematic view of a light source and the housing according to an embodiment of the present disclosure.

REFERENCE NUMERALS IN THE DRAWINGS

[0027] **10**, housing; **11**, receiving cavity; **11***a*, first mounting portion; **11***b*, first positioning rib; **11***c*, second positioning rib; **11***d*, second mounting portion; **11***e*, fixation tab; **11***f*, limiting protrusion; **12**, first through opening; **13**, mounting structure; **13***a*, tab; **13***b*, mounting groove; **14**, upper cover; **15**, lower cover; **16**, second through opening; **17**, screw; **18**, hand-held portion; **19**, through hole; **20**, master control module; **30**, drive assembly; **31**, body; **32**, output shaft; **32***a*, slot; **40**, nail grinding member; **41**, grinding head; **42**, connection rod; **43**, connecting base; **43***a*, joining portion; **43***b*, insertion portion; **50**, power supply; **60**, display; **61**, protective screen; **62**, display panel; **70**, charging port; **80**, foam; **90**, sound insulating foam; **100**, collection cover; **101**, collection portion; **102**, a snapping portion; **110**, light source; **120**, switch assembly; **121**, motor control switch; **121***a*, press switch; **121***b*, toggle switch; **122**, light source control button.

DETAILED DESCRIPTION

[0028] To be noted that, if no conflict is caused, features in various the embodiments of the present disclosure may be combined with each other. Preferred embodiments of the present disclosure will be described in detail by referring to the accompanying drawings.
[0029] The present disclosure provides a nail grinder **1000**, as shown in FIG. **1** to FIG. **3**, the nail grinder **1000** includes a housing **10**, a master control module **20**, a drive assembly **30**, a nail grinding member **40**, a power supply **50**, and a display **60**. The housing **10** defines a receiving cavity **11**. A wall of the receiving cavity **11** defines a first through opening **12** that communicates

with an exterior of the housing **10**. A mounting structure **13** is arranged on an outer surface of the housing **10**. The master control module **20** is received in the receiving cavity **11** and is disposed on a side of the mounting structure **13**, for example, an orthographic projection of the mounting structure **13** onto the housing at least partially overlaps with an orthographic projection of the master control module **20** onto the housing. The drive assembly **30** is received in the receiving cavity **11** and is electrically connected to the master control module **20**. The nail grinding member **40** is at least partially exposed out of the receiving cavity **11**. The nail grinding member **40** is connected to the drive assembly **30** through the first through opening **12**, such that the drive assembly **30** drives the nail grinding member **40** to rotate. The power supply **50** is received in the receiving cavity **11** and is electrically connected to the master control module **20**. The display **60** is at least partially mounted on the mounting structure **13** and is electrically connected to the master control module **20**.

[0030] According to the above embodiment, the nail grinder **1000** provides a larger space to receive the power supply **50**, such that an operation endurance of nail grinder **1000** is increased.

[0031] Specifically, the display **60** is arranged at an outside of the housing **10** via the mounting structure **13** and is prevented from occupying a portion of the receiving cavity **11**, and therefore, a larger space is available for receiving the battery, and the power capacity of the battery may be increased. A larger power capacity of the battery means that more electrical energy can be stored, and the operation endurance of the nail grinder can be prolonged. In addition, since increasing the power capacity, the user may use the nail grinder **1000** for a longer period of time without charging the nail grinder **1000** frequently, and the nail grinder **1000** may be more practical and may be used more conveniently.

[0032] As shown in FIG. **2**, the housing **10** includes an upper cover **14** and a lower cover **15**. The upper cover **14** and the lower cover **15** cooperatively define the receiving cavity **11**. The upper cover **14** and the lower cover **15** may be connected to each other by threaded connection, snap connection, and so on, such that other components may be received in the receiving cavity **11** easily.

[0033] As shown in FIG. **1**, in an embodiment, the housing **10** includes two end portions and a hand-held portion **18**. The two end portions are opposite to each other in a length direction of the housing. The hand-held portion **18** is curved and is recessed towards the receiving cavity **11**, such that the hand-held portion **18** may fit with a hand optimally and may be held by the hand of the user easily, and the hand-held portion **18** may not be dropped out of the hand while being in use.

[0034] Locations at which the master control module **20**, the drive assembly **30** and the power supply **50** are arranged may be various. As shown in FIG. **2** and FIG. **4**, in an embodiment, the drive assembly **30** is located between the nail grinding member **40** and the power supply **50**. In the present embodiment, the drive assembly **30** is disposed near the first through opening **12** to reduce a space of the receiving cavity **11** occupied by the drive assembly **30**. The master control module **20** and the power supply **50** are disposed on a side of the drive assembly **30** away from the first through opening **12**. The master control module **20** is disposed on a side of the power supply **50** near the display **60** and is mounted on the wall of the receiving cavity of the housing **10**, such that more space is available to receive the power supply **50**.

[0035] In order to better secure the master control module **20**, the drive assembly **30** and the power supply **50**, as shown in FIG. **5** to FIG. **8** of the present disclosure, a first mounting portion **11***a* and a second mounting portion **11***d* are arranged in the receiving cavity **11**. The first mounting portion **11***a* is disposed on a side of the first through opening **12** away from the nail grinding member **40**. The second mounting portion **11***d* is disposed on a side of the first mounting portion **11***a* away from the first through opening **12**. The first mounting portion **11***a* is configured to secure the drive assembly **30**, and the second mounting portion **11***d* is configured to secure the master control module **20** and the power supply **50**.

[0036] Specifically, the first mounting portion **11***a* includes a first positioning rib **11***b* and a second

positioning rib **11***c*. The first positioning rib **11***b* and the second positioning rib **11***c* are disposed on the wall of the receiving cavity **11**. The first positioning rib **11***b* is disposed on the upper cover **14**, and the second positioning rib **11***c* is disposed on the lower cover **15**. The first positioning rib **11***b* and the second positioning rib **11***c* to cooperatively define a mounting cavity. The drive assembly **30** may be received in the mounting cavity, and an outer peripheral surface of the drive assembly **30** may be surrounded by the first positioning rib **11***b* and the second positioning rib **11***c*.

[0037] In this way, the drive assembly **30** may be arranged in the housing **10** quickly and conveniently. It is only necessary to place the drive assembly **30** on the second positioning rib **11***c* and to close the upper cover **14** with respect to the lower cover **15**, and in this way, the drive assembly **30** can be fixedly arranged in the mounting cavity, and a position of the drive assembly **30** may be limited, greatly reducing an assembling time.

[0038] As shown in FIG. **7** and FIG. **8**, the second mounting portion **11***d* includes a fixation tab **11***e* and a limiting protrusion **11***f*. The fixation tab **11***e* protrudes from the wall of the receiving cavity **11** and is disposed on a side of the housing **10** away from the mounting structure **13**. The fixation tab **11***e* is configured to provide a mounting surface for the master control module **20**, allowing the master control module **20** to be mounted easily. The limiting protrusion **11***f* is disposed on a side of the wall of the receiving cavity **11** opposite to the fixation tab **11***e*. The limiting protrusion **11***f* is configured to limit the power supply **50**. The master control module **20** and the power supply **50** are clamped between the fixation tab **11***e* and the limiting protrusion **11***f*, such that connection between the master control module **20** and the housing **10** and connection between the power supply **50** and the housing **10** is more stable

[0039] The fixation tab **11***e* and the master control module **20** may be secured to each other in various ways. For example, the fixation tab **11***e* and the master control module **20** may be secured to each other by threaded connection or snapped connection. Exemplarily, as shown in FIG. **7**, in the present disclosure, the fixation tab **11***e* defines a threaded hole, and the master control module **20** defines an avoidance hole. A screw **17** extends through the avoidance hole of the master control module **20** to be threaded with the threaded hole. Therefore, the master control module **20** is firmly connected to the housing **10** based on a tightening force of the screw **17**. In this way, connection between the master control module **20** and the housing **10** is more secure, and in addition, the connection based on the screw **17** may be disassembled easily. In some embodiments, the fixation tab **11***e* may protrude slightly from the wall of the receiving cavity **11** to allow the master control module **20** to attach more tightly with the wall of the receiving cavity **11**. In this way, a less space of the receiving cavity **11** is occupied, and more space is provided to receive the power supply **50**. Preferably, in the present disclosure, a side of the limiting protrusion **11***f* facing the power supply **50** has a semi-curved surface to better attach to a surface of the power supply **50**, such that the power supply **50** may be optimally limited and fixed.

[0040] As shown in FIG. **9**, in the present disclosure, the power supply **50** is electrically connected to a charging port **70**. The charging port **70** is exposed out of the housing **10** and is independently disposed at one of the two ends of the housing **10** to charge the power supply **50**. In some embodiments, the charging port **70** is located in a center of the end, such that the charging may be performed easily.

[0041] In the present disclosure, the drive assembly **30** may be a motor. In some embodiments, the drive assembly **30** is a speed-regulated motor, which may provide different rotation speeds to allow the user to grind various portions of the body. For example, when dead skin is to be removed, the user may select a low-speed gear, to avoid bleeding caused by damaging the skin. When the nail is to be grinded, the user may select a high-speed gear, to improve fineness of the grinding. Therefore, the nail grinder **1000** has better adaptability and is safe.

[0042] The display **60** in the present disclosure may display an operation of the nail grinder **1000** when the nail grinder **1000** is in use, providing parameters the nail grinder **1000** to the user in real-time. For example, the display **60** may display the remaining power or display the rotation speed of

the motor, such that the user may use the nail grinder **1000** conveniently. The display **60** is electrically connected to the master control module **20**. In some embodiments, the display **60** may be disposed at the end of the housing **10** away from the first through opening **12** and is misaligned with the hand-held portion **18**. In this way, when the user is operating the nail grinder **1000**, the display **60** may be observed by the user and may not be blocked by fingers of the user.

[0043] As shown in FIG. **3**, in an embodiment, a portion of the housing **10** serves as the mounting structure **13**. A surface of the mounting structure **13** facing away from the receiving cavity **11** has a first region and a second region surrounding a circumference of the first region. The first region is recessed relative to the second region towards the receiving cavity **11**. The recessed first region and the second region cooperatively define a mounting groove **13***b*. In some embodiments, the second region may be aligned with the outer surface of another portion of housing **10** adjacent to the second region. In some embodiments, the second region protrudes from the outer surface of the another portion of housing **10** adjacent to the second region; and in this case, the mounting structure **13** may be a tab **13***a* that protrudes from the outer surface of the housing **10**. The display **60** is mounted the mounting structure **13**. More specifically, the display **60** is received in the mounting groove **13***b* of the mounting structure **13**, such that the display **60** does not occupy the internal space of the housing **11**. In addition, since an opening of the mounting groove **13***b* of the mounting structure **13** faces the outside of the housing **10**, the display **60** may be mounted more easily.

[0044] The mounting groove **13***b* may be in various shapes. For example, in the present embodiment, the mounting groove **13***b* may be a straight groove, each of two ends of the straight groove is semi-circular. In this way, an outer appearance of the housing **11** may be better.

[0045] By defining the mounting groove **13***b*, the display **60** may be mounted and limited better by a side wall and a bottom wall of the mounting groove **13***b*, and therefore, stability of the connection is improved. In addition, the mounting groove **13***b* provides protection for the display **60**.

[0046] To be noted that, according to the above embodiment, an edge of the display **60** is covered by the side wall of the mounting groove **13***b*, such that the outer appearance of the nail grinder **1000** may be better.

[0047] The display **60** of the present disclosure includes a display panel **62** with a protective screen **61** covering the display panel **62**. The protective screen **61** protects the display panel **62** from collision, improving collision resistance of the nail grinder **1000**. The display panel **62** is configured to display the parameters of the nail grinder **1000** in real-time. The display panel **62** may be integrated to the master control module **20** to reduce the number of components, such that installation and maintenance may be performed easily.

[0048] Specifically, the protective screen **61** is made of a transparent or semi-transparent material. Exemplarily, the protective screen **61** may be glass or a transparent plastic cover. In some embodiments, only a portion of the protective screen **61** corresponding to a displaying region of the display panel **62** is made of the transparent material, and the rest portion of the protective screen **61** may be subjected to other treatments, such as being configured into a non-transparent dark color for covering the mounting groove. Alternatively, the rest portion of the protective screen **61** may be directly printed with a pattern to improve the overall outer appearance.

[0049] As shown in FIG. **3**, in an embodiment, the bottom wall of the mounting groove **13***b* defines a second through opening **16** communicating with the receiving cavity **11**. The display panel **62** is received in the second through opening **16**. The protective screen **61** is received in the mounting groove **13***b*. The side wall of the mounting groove **13***b* may limit and protect the protective screen **61**. The display panel **62** may be mounted on a wall of the second through opening **16**, and the wall of the second through opening **16** may limit the display panel **62**. In this way, stability and reliability of the connection of the display **60** may be improved.

[0050] Specifically, a contour of the groove wall of the mounting groove **13***b* matches with an outer contour of the protective screen **61** to improve the limiting and fixation effect on the protective

screen **61**. In some embodiments, the protective screen **61** and the groove wall of the mounting groove **13***b* are connected to each other in an interference fit or by an adhesive to ensure firm connection therebetween and to avoid accidental separation. In addition, a depth of the mounting groove **13***b* may be slightly larger than a thickness of the protective screen **61**. After the protective screen **61** is attached to the bottom of the mounting groove **13***b*, the protective screen **61** does not protrude from an upper edge of the groove wall, such that additional protection is provided for the protective screen **61**. Similarly, a contour of the wall of the second through opening **16** matches with an outer contour of the display panel **62**. The contour of the wall of the second through opening **16** may be circular or polygonal. In the present embodiment, the second through opening **16** is rectangular to provide more space for the display panel **62**.

[0051] As shown in FIG. **4**, in an embodiment, the nail grinder **1000** further includes a foam **80**. A surface of the foam **80** is provided with an adhesive layer. The power supply **50** is adhered to the side of the master control module **20** away from the display **60** through the foam **80**. In this way, the master control module **20** and the power supply **50** are connected to each other by the foam **80**, simplifying installation and maintenance. In addition, the foam **80** has certain elasticity and softness. When the nail grinder **1000** is subjected to an external impact, the foam **80** provides shock absorption and a cushioning effect. The impact applied to the power supply **50** is reduced and the master control module **20**, and the nail grinder **1000** is more reliable.

[0052] The nail grinder **1000** in the present disclosure is detachably connected to the drive assembly **30** to allow the user to arrange various nail grinding members **40** to meet various demands.

[0053] As shown in FIG. **10**, in an embodiment, the drive assembly **30** includes a body **31** and an output shaft **32**. The output shaft **32** is arranged on the body **31**. The body **31** is configured to drive the output shaft **32** to rotate. A side of the output shaft **32** away from the body **31** defines a slot **32***a*. The nail grinding member **40** includes a grinding head **41** and a connection rod **42**. An end of the connection rod **42** is connected to the grinding head **41**, and the other end is detachably inserted into the slot **32***a*. In this way, the user may replace among various nail grinding members **40** to meet different demands. Moreover, the connection rod **42** is connected to the slot **32***a* by plugging and unplugging, which is more convenient for the user to remove and to mount the nail grinding member.

[0054] In addition, as shown in FIGS. **12***a-c*, in the present embodiment, there are various types of grinding heads **41**. For example, the grinding head **41** may be a needle-shaped head, a bullet-shaped head, a conical body with a flat head, a conical body with a round head, or a round disc-shaped head, and so on. Different shapes of the grinding heads **41** may be suitable to grinding different parts and may provide different grinding effects, improving the user's experience. The user may select an appropriate shape of the grinding head **41** to achieve a desired nail grinding effect and a desired trimming requirement.

[0055] In the above embodiment, a shape of the connection rod **42** may be various. For example, the connection rod **42** may be cylindrical or conical. In the present embodiment, a cross-section of the other end of the connection rod **42** is different from a circle. Exemplarily, the other end of the connection rod **42** may be elliptical or polygonal. More specifically, the connection rod **42** may be hexagonal. The slot **32***a* may be a slot having a mimetic shape adapted to the shape of the other end of the connection rod **42**. In this way, since the hexagonal shape has a clear directional performance, when hexagonal end is inserted into the hexagonal slot, the connection between the end of the connection rod and the slot is improved, and the connection rod **42** is prevented from rotating in the slot **32***a*.

[0056] As shown in FIG. **11**, in an embodiment, the nail grinding member **40** further includes a connection base **43**, the connection rod **42** extends through the connection base **43** and is rotationally connected to the connection base **43**. The connection base **43** is inserted in the first through opening **12** to enable the connection base **43** to be fixedly connected to the housing **10** in a

circumferential direction of the connection rod **42**. Since the connection rod **42** is rotationally connected to the connection base **43**, stability of rotation of the connection rod **42** is improved, such that the grinding head **41** may rotate smoothly and stably, and a nail grinding effect may be improved. The connection base **43** is inserted in the first through opening **12**, and the first through opening **12** limits the connection base **43** to prevent the connection base **43** from rotating as the connection rod **42** rotates.

[0057] Specifically, the connection base **43** includes a joining portion **43***a* and an insertion portion **43***b*. The joining portion **43***a* is disposed at a side of the insertion portion **43***b* away from the first through opening **12**. The joining portion **43***a* increases a rotational contact area contacting the connection rod **42**, such that stability of the rotation is improved. The insertion portion **43***b* improves the limiting effect of the first through opening **12** applied to the connection base **43**. In addition, an outer contour of the insertion portion **43***b* matches with a shape of the first through opening **12**, and the shape of the first through opening **12** is different from a circle. In the present embodiment, each of the first through opening **12** and the insertion portion **43***b* is hexagonal, such that after the insertion portion **43***b* of the connection base **43** is inserted into the first through opening **12**, the insertion portion **43***b* may be completely limited, and the nail grinder **1000** is more reliable and stable.

[0058] As shown in FIG. **13**, in an embodiment, the nail grinder **1000** further includes a collection cover **100**. The collection cover **100** includes a collection portion **101** and a snapping portion **102**. The collection portion **101** is disposed on a side of the grinding head **41** along a direction perpendicular to a rotation axis of the grinding head **41**. The snapping portion **102** is connected to a side of the collection portion **101** facing towards the housing **10**. The snapping portion **102** is snapped to the connection base **43**. The collection portion **101** collects, in time, dead skin and debris that are grinded off from the nail and prevents the dead skin and the debris from splashing out, enabling the user to clear and clean the nail grinder **1000**. The snapping portion **102** is snapped on the connection base **43**, allowing the collection cover **100** to be detachably arranged, such that the user may determine, based on demands, whether or not to use the collection cover **100**, and the nail grinder **1000** may be used flexibly.

[0059] Specifically, the collection portion **101** is arranged extending in a rotation direction of the grinding head **41** to increase a coverage area of the collection portion **101**, allowing collection and cleaning to be performed easily. The snapping portion **102** is adapted to and snapped to the connection base **43**. In the present embodiment, the snapping portion **102** is U-shaped. In this way, the user may quickly mount the collection cover **100** on the connection base **43**, and quick-release may be achieved. The user only needs to snap the U-shaped snapping portion **102** to the connection base **43** to achieve the connection, allowing the nail grinder **1000** to be used more conveniently and easily.

[0060] In the present embodiment, the collection cover **100** may be made of a transparent material, such that the user may observe a nail grinding process and check a collection effect when using the nail grinder **1000**.

[0061] As shown in FIG. **4**, in an embodiment, the nail grinder **1000** further includes a sound insulating foam **90**. The sound insulating foam **90** wraps around the body **31** and is mounted in the first mounting portion **11***a*. The sound insulating foam **90** reduces noise generated by the body **31** of the drive assembly **30**. In this way, a quiet operating effect may be achieved when the nail grinder **1000** is in use, providing a more comfortable usage environment to the user. Specifically, the sound insulating foam **90** has a sound absorbing performance, effectively reduces transmission of the noise generated by the drive assembly **30**, and reduces interference to the user.

[0062] As shown in FIG. **4**, in an embodiment, in a direction perpendicular to a length direction of the nail grinder **1000**, a size of the body **31** is larger than a diameter of the power supply **50**. That is, a height of the body **31** is smaller than a height of the power supply **50**. A larger sized body **31** may receive more motor members and rotors, such that the drive assembly **30** provides a greater

output capacity. In addition, the height of the body **31** is smaller than the height of the power supply **50**, such that the body **31** provides more space to receive the power supply **50**, such that the power capacity of the power supply **50** may be improved, and the nail grinder **1000** may have a more reasonable design.

[0063] As shown in FIG. **4**, in an embodiment, an angle between a rotation axis of the output shaft **32** and a center line of the power supply **50** is less than or equal to 5°. That is, the rotation axis of the output shaft **32** substantially coincides with or parallel to the center line of the power supply **50**. In this way, the space can be effectively utilized, especially in scenarios where a limited space is available or a compact design is required. In the present disclosure, the size of the housing **10** may be reduced to allow the nail grinder **1000** to be smaller, to have a more compact structure, and to be portable.

[0064] As shown in FIG. **1**, in an embodiment, the nail grinder **1000** further includes further comprises a switch assembly **120**. The switch assembly **120** and the display **60** are disposed on a same side of the housing **10**. The switch assembly **120** includes a motor control switch **121**. The motor control switch **121** is at least partially exposed out of the housing **10** and is connected to the master control module **20**. The motor control switch **121** is configured to control the drive assembly **30** to start operating or to stop operating. In this way, the user, when operating the nail grinder **1000**, may check information displayed on the display.

[0065] The motor control switch **121** may be operated in various ways. As shown in FIG. **1**, in an embodiment, the motor control switch **121** is a press switch **121***a*. The press switch **121***a* controls the drive assembly **30** to start operating or to stop operating, furthermore, the press switch **121***a* adjusts the rotation speed of the drive assembly **30**. For example, the user presses the press switch **121***a* to switch among a low-speed mode, a medium-speed mode, and a high-speed mode to meet different trimming demands. In another embodiment, the motor control switch **121** is a toggle switch **121***b*. In a toggle direction of the toggle switch **121***b*, the toggle switch **121***b* has a first toggle position, a second toggle position, and a third toggle position sequentially. When the first toggle switch **121***b* is set at the first toggle position, the drive assembly **30** provides a positive driving. When the first toggle switch **121***b* is set at the second toggle position, the drive assembly **30** stops operating. When the first toggle switch **121***b* is set at the third toggle position, the drive assembly **30** provides a negative driving. In this way, the toggle operation may be performed easily, and false touches may be reduced. In addition, various adjustments may be achieved by arranging only one motor control switch **121**, the user may witch modes rapidly.

[0066] To be noted that, when the nail grinder **1000** is being used, nails or other debris may jam the nail grinding member **40**, resulting in the nail grinding member **1000** unable to operate properly. Based on the above embodiment, the drive assembly **30** drives the nail grinding member **40** to rotate forwardly and reversely, the rotation direction of the nail grinding member **40** is changed, the jamming situation may be solved. For example, when the nail grinding member **40** is jammed, the user may attempt to reversely rotate the motor to release the jam and to restore the operation of the nail grinder **1000**.

[0067] As shown in FIG. **14**, in an embodiment, the nail grinder **1000** further includes a light source **110**. The light source **110** is electrically connected to the master control module **20**. The light source **110** emits light towards a region adjacent to the nail grinding member **40**. The adjacent region is located on a side of the nail grinding member **40** away from a rotational center line of the nail grinding member **40**. Specifically, when the user is using the nail grinder **1000**, the user needs to place the grinding portion at the region adjacent to the nail grinding member **40**. Since the light source **110** emits light towards the adjacent region, the light source **110** provides light to the grinding portion when the user is grinding the nail, such that the user may observe the grinding situation more clearly. The user may control a position and strength of the nail grinder **1000** more accurately, preventing accidents and improving operation safety.

[0068] Specifically, the light source **110** may be a light-emitting diode (LED) lamp. In an

embodiment, the light source **110** may be arranged inside the housing **10**. The housing **10** defines a through hole **19**. A light emitting surface of the LED lamp is exposed out of the housing **10** through the through hole **19**. The housing **10** may protect the LED lamp. In addition, since only the light emitting surface of the LED lamp is exposed out of the housing **10**, the outer appearance of the nail grinder **1000** may be better.

[0069] As shown in FIG. **1**, in an embodiment, the housing **10** includes two ends disposed opposite each other in the length direction of the housing **10**. The display is disposed near one of the two ends of the housing **10**. The light source **110** is disposed near the other of the two ends of the housing **10**. The switch assembly **120** is disposed between the display **60** and the light source **110**. In an embodiment, the switch assembly **120** and the display **60** are disposed on a same side of the housing **10**, allowing the user to manipulate and observe the nail grinder **1000** at the same time. In this way, when the user holds the nail grinder **1000** with four fingers, the user may use the thumb to manipulate the switch assembly **120**, convenience of the manipulation is greatly improved, and the user may perform adjustment to meet various demands while using the nail grinder **1000**.

[0070] In the above embodiments, the light source **110** may be activated in various ways. As shown in FIG. **1**, in an embodiment, the switch assembly **120** further includes a light source control button **122**. The light source control button **122** is exposed on the outer surface of the housing **10** and is connected to the master control module **20**. The light source control button **122** is configured to control the light source **110** to be turned on or to be turned off. The user may determine whether to use the light source **110** according to a usage environment, such that power consumption of the nail grinder **1000** may be saved. In another embodiment, activation of the light source **110** may be synchronously turned on when the drive assembly **30** is started to operate. In this way, operations are simplified, and the user may use the nail grinder **1000** conveniently.

[0071] It should be understood that the above embodiments are described to illustrate technical solutions of the present disclosure, and does not limit the present disclosure. Any ordinary skilled person in the art may modify or replace some of the technical features with equivalent ones based on the technical solution recorded in the above embodiments. All such modifications and replacements shall fall within the scope of the appended claims of the present disclosure.

Claims

1. A nail grinder, comprising: a housing, having a receiving cavity, wherein a wall of the receiving cavity defines a first through opening communicating with to an exterior of the housing, a mounting structure is arranged on an outer surface of the housing, and a cavity of the mounting structure is fluidly connected with the receiving cavity; a master control module, received in the receiving cavity and disposed at a side of the mounting structure; a drive assembly, received in the receiving cavity and electrically connected to the master control module; a nail grinding member, at least partially exposed out of the receiving cavity and connected to the drive assembly through the first through opening, wherein the drive assembly is configured to drive the nail grinding member to rotate; a power supply, received in the receiving cavity and electrically connected to the master control module; and a display, at least partially mounted on the mounting structure and electrically connected to the master control module; wherein, the master control module is attached to an inner surface of the housing; the power supply is disposed at a side of the master control module opposite to the inner surface of the housing; and the drive assembly is connected to and extending away from an end of the master control module and an end of the power supply.

2. The nail grinder according to claim 1, wherein a portion of the housing serves as the mounting structure.

3. The nail grinder according to claim 2, wherein a surface of the mounting structure facing away from the receiving cavity has a first region and a second region surrounding a circumference of the first region, the first region is recessed relative to the second region towards the receiving cavity,

the recessed first region and the second region cooperatively define a mounting groove, the display is mounted in the mounting groove.

4. The nail grinder according to claim 3, wherein a bottom of the mounting groove defines a second through opening communicating with the receiving cavity, the display comprises a display panel and a protective screen covering the display panel, the display panel is integrated into the master control module and is received in the second through opening, and the protective screen is received in the mounting groove.

5. The nail grinder according to claim 1, wherein, along a length direction of the nail grinder, the drive assembly is disposed between the nail grinding member and the power supply; and an orthographic projection of the power supply onto the inner surface of the housing is entirely located out of an orthographic projection of the drive assembly onto the inner surface of the housing.

6. The nail grinder according to claim 1, further comprising a foam, wherein an adhesive layer is arranged on a surface of the foam, and the power supply is adhered to a side of the master control module away from the display via the foam.

7. The nail grinder according to claim 1, wherein the housing comprises two end portions and a hand-held portion, the two end portions are disposed opposite to each other in a length direction of the housing, the hand-held portion is disposed between the two end portions, and the hand-held portion is curved and is recessed towards the receiving cavity.

8. The nail grinder according to claim 1, wherein the nail grinding member is detachably connected to the drive assembly.

9. The nail grinder according to claim 8, wherein the drive assembly comprises a body and an output shaft, the output shaft is arranged on the body, the body is configured to drive the output shaft to rotate, a side of the output shaft away from the body defines a slot, the nail grinding member comprises a grinding head and a connection rod, an end of the connection rod is connected to the grinding head, and the other end of the connection rod is detachably inserted in the slot.

10. The nail grinder according to claim 9, wherein a cross section of the other end of the connection rod is different from a circle, and the slot has a shape matching with a shape of the other end of the connection rod.

11. The nail grinder according to claim 9, wherein the nail grinding member further comprises a connection base, the connection rod extends through the connection base and is rotatably connected to the connection base, the connection base is inserted in the first through opening, and the connection base is fixedly connected to the housing in a circumferential direction of the connection rod.

12. The nail grinder according to claim 11, further comprising: a collection cover, wherein the collection cover comprises a collection portion and a snapping portion, the collection portion is disposed on a side of the grinding head in a direction perpendicular to a rotation axis of the grinding head, the snapping portion is connected to a side of the collection cover facing the housing, the snapping portion is snapped to the connection base.

13. The nail grinder according to claim 9, further comprising: a sound insulating foam that wraps the body.

14. The nail grinder according to claim 1, wherein, along a direction perpendicular to a length direction of the nail grinder, a size of the drive assembly is greater than a size of the power supply.

15. The nail grinder according to claim 1, wherein, an angle between a rotation axis of the drive assembly substantially coincides with or is parallel to a center line of the power supply.

16. The nail grinder according to claim 1, further comprising a switch assembly, wherein the switch assembly and the display are disposed on a same side of the housing.

17. The nail grinder according to claim 16, wherein the switch assembly comprises a motor control switch, the motor control switch is at least partially exposed out of the housing and is connected to the master control module, and the motor control switch is configured to control the drive assembly to start operating or to stop operating.

18. The nail grinder according to claim 17, further comprising a light source, wherein the light source is electrically connected to the master control module, the light source emits light towards a region adjacent to the nail grinding member, and the adjacent region is located on a side of the nail grinding member opposite to a rotational center line of the nail grinding member.

19. The nail grinder according to claim 18, wherein the housing comprises two ends disposed opposite each other in a length direction of the housing, the display is disposed adjacent to one of the two ends of the housing, and the light source is disposed adjacent to the other one of the two ends of the housing, and the switch assembly is disposed between the display and the light source.

20. The nail grinder according to claim 19, wherein the switch assembly further comprises a light source control button, the light source control button is exposed from the outer surface of the housing and is connected to the master control module, the light source control button is configured to switch on and switch off the light source.