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### TRACK LIGHT

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#### Abstract

A track light, including a track, a lamp and latch structures connecting the track and the lamp. Each latch structure comprises a latch member, a connection member, a gasket and a locking member. The lamp is provided with mounting portions and mounting holes penetrating through the mounting portions. The connection members penetrate through the mounting holes and extend out of the lower surfaces of the mounting portions. The locking members are inserted from bottom to top into the connection members and are locked to be fixed to the tail ends of the connection members. The gaskets are sleeved on the outer side of the tail ends of connection members and are pressed to be fixed between the lower surfaces of the mounting portions and the locking members. The connection members are configured to penetrate through the mounting holes and then extend out of the lower surfaces of the mounting portions.

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## Background/Summary

CROSS-REFERENCE TO RELATED APPLICATION [0001] The present application is based upon and claims the priority of PCT patent application No. PCT/CN2023/129035 filed on Nov. 1, 2023 claims the priority of the Chinese patent application with application Ser. No. 202222890589.X filed on Nov. 1, 2022, the entire contents of which are hereby incorporated by reference herein for all purposes.

### TECHNICAL FIELD

[0002] The present disclosure relates to a track light, and belongs to a technical field of track lights. BACKGROUND

[0003] Sometimes, a locking structure is provided on a lamp of a track light to connect with a track. Specifically, the lamp is placed in the track and then a locking structure is turned so that the locking structure is clamped with the track to achieve a detachable connection between the lamp and the track.

### SUMMARY

[0004] The present disclosure provides a track light.

[0005] Accordingly, the track light provided in this disclosure may include a track, a lamp and a locking structure connecting the track and the lamp, where the locking structure may include a locking member for insertion into the track, a connection member rotatably connected to the lamp, a spacer and a locking fastener.

[0006] The lamp may be provided with a mounting portion and a mounting hole passing through the mounting portion, the connection member passes through the mounting hole and may extend beyond a lower surface of the mounting portion.

[0007] The locking fastener may be inserted into the connection member from lower to upper and may be locked and fixed with a terminal end of the connection member, the spacer may be sleeved outside the terminal end of the connection member and may be pressed and fixed between the lower surface of the mounting portion and the locking fastener.

[0008] It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the present disclosure.

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## Description

### BRIEF DESCRIPTION OF DRAWINGS

[0009] FIG. 1 is a schematic perspective view of a track light according to an example of the present disclosure.

[0010] FIG. 2 is a schematic perspective view of a bottom structure of the lamp in FIG. 1.

[0011] FIG. 3 is an enlarged view of part A in FIG. 2.

[0012] FIG. 4 is a cross-sectional view of the lamp of FIG. 2.

[0013] FIG. 5 is an enlarged view of part B in FIG. 4.

[0014] FIG. 6 is a schematic perspective view of the locking structure in FIG. 1.

[0015] FIG. 7 is an exploded view of the locking structure in FIG. 6.

[0016] FIG. 8 is a schematic perspective view of the base plate in FIG. 2.

[0017] FIG. 9 is a partial enlarged view of part C in FIG. 8.

[0018] FIG. 10 is a cross-sectional view of the track light of FIG. 1.

#### DETAILED DESCRIPTION

[0019] In order to make the objectives, technical solutions and advantages of the present disclosure clearer, the present disclosure is described in detail below with reference to the accompanying drawings and examples.

[0020] Description of reference numerals that may be used in this disclosure may include: [0021] track light **100**, locking structure **200**, lamp **300**, track **400**, connection member **1**, locking hole **11**, connection surface **12**, locking fastener **2**, locking shaft **21**, locking head **22**, spacer **3**, handle **4**, rotating portion **41**, grip portion **42**, locking member **5**, rotating shaft portion **51**, abutment portion **52**, receiving groove **53**, base plate **6**, mounting portion **7**, mounting hole **71**, rotation space **72**, sliding groove **8**, through groove **9**, blocking tab **10**.

[0022] Sometimes, it is assembling a locking structure with the lamp, through forming a hole in the lamp, making one end of the locking structure extend into the hole, and disposing a screw connected with the locking structure at the other end of the locking structure, and through turning the screw, so as to lock the locking structure to the lamp. However, this locking method needs to control the locking degree of the screw during the actual production process. If the locking degree is large, the locking structure will be difficult to rotate relative to the lamp. If the locking degree is small, it will be prone to separate the locking structure from the screw during use, resulting in an unstable connection phenomenon, and the degree of locking is difficult to control, which is not conducive to mass production.

[0023] In view of this, it is necessary to propose a new locking structure to solve the above problems.

[0024] Referring to FIG. 1, the present disclosure discloses a track light **100** for illumination. The track light **100** includes a lamp **300**, a track **400**, and a locking structure **200** provided on the lamp **300**, wherein the lamp **300** is detachably connected to the track **400** through the locking structure **200**, so that the track **400** can supply power to the lamp **300**. Specifically, the locking structure **200** includes a locking member **5** for insertion into the track **400**, a connection member **1** rotatably connected to the lamp **300**, a spacer **3** and a locking fastener **2**. The locking structure **200** can rotate relative to the lamp **300**. In a case where the locking member **5** of the locking structure **200** extends into the track **400**, the locking structure **200** is turned so that the locking structure **200** is engaged with the track **400**. At this time, stable power supply from the track **400** to the lamp **300** can be achieved.

[0025] In this example, two locking structures **200** are provided, which are respectively located at two ends of the lamp **300**, so as to improve the connection stability between the lamp **300** and the track **400**. Of course, in other examples, the locking structure **200** may be set to other numbers according to actual conditions, and is not limited here.

[0026] In this application, the track **400** and the mounting structure of the mounting surface, the power supply structure between the track **400** and the lamp **300**, and the light-emitting component (not shown) of the lamp **300** may all be designed according to the prior art, and the main improvement point of this application is the locking structure **200** and the connection method between the locking structure **200** and the lamp **300**, and the following specification will specifically describe the locking structure **200**.

[0027] Referring to FIGS. 2 to 9, the locking structure **200** includes a connection member **1**, a spacer **3** and a locking fastener **2**, and the lamp **300** is provided with a mounting portion **7** and a mounting hole **71** passing through the mounting portion **7**, and the connection member **1** passes through the mounting hole **71** and extends beyond a lower surface of the mounting portion **7**, the

locking fastener **2** is inserted into the connection member **1** from lower to upper and is locked and fixed with a terminal end of the connection member **1**, and the spacer **3** is sleeved outside the terminal end of the connection member **1** and is pressed and fixed between the lower surface of the mounting portion **7** and the locking fastener **2**. That is to say, in a direction of an axis of the connection member **1**, a depth of the mounting hole **71** is less than a height of the connection member **1**.

[0028] Among them, the lamp **300** includes a base plate **6** disposed between the track **400** and the light-emitting component, and mounting portions **7** are disposed at both ends of the base plate **6**. Mounting holes **71** extend through the mounting portion **7** in a mounting direction of the lamp **300** and the track **400**, and the connection member **1** passes through the mounting hole **71** from a side of the base plate **6** close to the track **400** toward a side close to the light-emitting component, the locking fastener **2** is provided on the side of the base plate **6** close to the light-emitting component and is locked and connected with the connection member **1**, and the locking fastener **2** is unable to pass completely through the mounting hole **71**. In a case where the locking fastener **2** is locked, the locking fastener **2** presses the spacer **3** to form a friction force between the locking fastener **2** and the base plate **6** to prevent the locking structure **200** from rotating relative to the mounting portion **7** in a free state.

[0029] Specifically, a difference between the height of the connection member **1** and the depth of the mounting hole **71** is  $0.9\text{ mm}\pm 0.2\text{ mm}$ , that is, in a case where the connection member **1** is received in the mounting hole **71**, the length of the connection member **1** extending outward from the inside of the mounting hole **71** is  $0.9\text{ mm}\pm 0.2\text{ mm}$ .

[0030] Stated alternatively, an end of the mounting portion **7** close to the light-emitting component is the lower surface, and an end of the connection member **1** close to the light-emitting component is a connection surface **12**. In a case where the connection member **1** is received in the mounting hole **71** and locked with the locking fastener **2**, a difference in height between the lower surface and the connection surface **12** is  $0.9\text{ mm}\pm 0.2\text{ mm}$ .

[0031] The locking fastener **2** includes a locking shaft **21** and a locking head **22** fixedly connected to the locking shaft **21**. The terminal end of the connection member **1** is provided with a concave locking hole **11**. The locking shaft **21** is inserted into the locking hole **11** such that the locking head **22** abuts against the connection member **1**. The spacer **3** is disposed between the locking head **22** and the mounting portion **7**. Among them, the locking hole **11** is recessed from one end of the connection member **1** close to the light-emitting component toward the track **400**, and the locking hole **11** is provided with internal threads, and the outer wall of the locking shaft **21** is provided with external threads. In a case where the locking shaft **21** is accommodated in the locking hole **11**, the internal threads mesh with the external threads to achieve a threaded connection between the locking shaft **21** and the connection member **1**. In a case where the locking fastener **2** is connected to the connection member **1**, an external tool is used to drive the locking head **22** to rotate and simultaneously causing the locking shaft **21** to rotate, thereby reduce a distance between the locking head **22** and the connection member **1** until the locking shaft **21** is completely received in the mounting hole **71** and the locking head **22** abuts against the connection member **1**. At this time, the spacer **3** is compressed to its minimum thickness.

[0032] When the locking structure **200** rotates, the locking structure **200** drives the locking fastener **2** to rotate synchronously, and a friction force is generated between the compressed spacer **3** and both the mounting portion **7** and the locking head **22** enabling the locking structure **200** to maintain a specific rotation angle without change, which improves the user's handling feel during use. At the same time, the locking fastener **2** is locked and connected to the connection member **1** and the locking head **22** abuts against the connection member **1**. There is no need to control the locking degree between the locking fastener **2** and the connection member **1** during production, which improves production efficiency, and there is no need to apply thread glue between the locking shaft **21** and the locking hole **11**, which saves the production cost of the lamp **300**. Preferably, the

locking fastener **2** is a screw.

[0033] The spacer **3** is an elastic spacer. In a free state, a thickness of the spacer **3** is greater than a distance between the locking head **22** and the mounting portion **7**, so that in a case where the locking fastener **2** and the connection member **1** are locked and connected, the spacer **3** can be compressed to generate a friction force between the locking head **22** and the mounting portion **7**. By setting the spacer **3** as an elastic spacer, on the one hand, the friction force between the locking structure **200** and the mounting portion **7** is increased, and on the other hand, the friction force between the locking structure **200** and the mounting portion **7** is smaller than the locking fastener **2** and the connection member **1**, the locking fastener **2** will not dislodge from the connection member **1** during the rotation. Preferably, the material of the elastic spacer is an elastic material, specifically a softer rubber product, such as a silicone spacer.

[0034] Specifically referring to FIGS. **5** to **9**, the locking structure **200** includes a handle **4** connected to the connection member **1**, the mounting portion **7** includes a rotation space **72** in communication with the mounting hole **71**, and the handle **4** is received in the rotation space **72** and rotatable with the connection member **1** as an axis in the rotation space **72**.

[0035] Specifically, the handle **4** includes a grip portion **42** and a rotating portion **41**, the rotating portion **41** is fixedly connected to the connection member **1**, and the grip portion **42** extends outward from the rotating portion **41** to push the rotating portion **41** and the connection member **1** to rotate relative to the mounting portion **7**. Among them, the rotation space **72** is recessed from one end of the mounting portion **7** away from the light-emitting component toward the light-emitting component, and the rotation space **72** is arranged in a triangular shape in a projection direction of the lamp **300**, and the grip portion **42** may respectively abut against two sides of the triangle to realize the rotation of the locking structure **200**, and the mounting hole **71** is provided at a vertex of the triangle.

[0036] The locking structure **200** has two usage statuses. In a case where the locking structure **200** is in a released state, the grip portion **42** abuts against one side of the rotation space **72**, and the grip portion **42** is perpendicular to the mounting portion **7** and protrudes outwardly. In a case where the locking structure **200** is in a locked state, the grip portion **42** abuts against the other side of the rotation space **72**, and the grip portion **42** attached to the edge of the mounting portion **7**, thereby reducing the volume of the lamp **300**. In this example, the grip portion **42** is arranged in an obtuse angle shape, the end of the grip portion **42** away from the rotating portion **41** is placed outside the mounting portion **7**, and the side of the grip portion **42** away from the rotating portion **41** is provided with anti-slip texture, thereby improving the user experience. Of course, in other examples, the grip portion **42** can also be set to other shapes according to actual conditions, and is not limited here.

[0037] The rotating portion **41** is located between the locking member **5** and the connection member **1**, and the connection member **1** extends from the rotating portion **41** toward the locking fastener **2** in a tapered manner. Specifically, the mounting hole **71** is arranged in a cylindrical shape, and the connection member **1** is arranged in a tapering cylindrical shape, so that the connection member **1** can be received in the mounting hole **71** and rotate in the mounting hole **71**.

[0038] Referring to FIGS. **6** and **7** in combination with FIG. **10**, the track **400** includes a sliding groove **8** and a blocking tab **10**, and the blocking tab **10** covers part of the sliding groove **8** to form a through groove **9** on the track **400** in communication with the sliding groove **8**. The locking structure **200** includes a locking member **5**, which passes through the through groove **9** and is received in the sliding groove **8**, so that part of the locking member **5** abuts against the blocking tab **10** to realize the connection between the locking structure **200** and the track **400**.

[0039] Specifically, the locking member **5** includes a rotating shaft portion **51** and an abutment portion **52** provided on the rotating shaft portion **51**, the rotating shaft portion **51** and the abutment portion **52** pass through the through groove **9**, and the abutment portion **52** is configured to rotate synchronously with the connection member **1**, so as to be received in the sliding groove **8** and to

abut against the blocking tab, or disengage from the sliding groove **8**. Specifically, the handle **4** is rotated while driving the abutment portion **52** to rotate, so that the abutment portion **52** abuts against or separates from the blocking tab **10** to connect or detach the locking structure **200** from the track **400**. The rotating shaft portion **51** and the connection member **1** are coaxially arranged, and the locking member **5** and the connection member **1** are separately arranged on both sides of the handle **4** to connect the lamp **300** and the track **400** respectively. The abutment portion **52** extends outward from the rotation shaft portion **51** to form a receiving groove **53** between the abutment portion **52** and the handle **4**. In a case where the abutment portion **52** is received in the sliding groove **8**, the blocking tab **10** is received in the receiving groove **53**.

[0040] In this example, two blocking tabs **10** are provided and arranged opposite to each other, the through groove **9** is formed between two blocking tabs **10**, and two abutment portions **52** are also provided and arranged opposite to each other. When the handle **4** is rotated to drive the abutment portion **52** rotates, the two abutment portions **52** respectively abuts against the two blocking tabs **10** to realize the installation of the locking structure **200** and the track **400**. Of course, in other examples, only one blocking tab **10** may be provided. At this time, one corresponding abutment portion **52** is provided. In a case where the abutment portion **52** is received in the sliding groove **8**, the handle **4** is rotated, so that the abutment portion **52** abuts against the blocking tab **10** to realize the installation of the locking structure **200** and the track **400**, which is not limited here.

[0041] In this example, the sliding groove **8** is arranged in a shape of a long groove and is located in the middle position of the track **400** to facilitate the connection of the locking structure **200** and the track **400**. Of course, in other examples, the sliding groove **8** may also be provided in other positions of the track **400**, which is not limited here.

[0042] With the foregoing in mind, in the locking structure of the present disclosure, by setting the connection member **1** extend beyond the lower surface of the mounting portion **7** after passing through the mounting hole **71**, that is, the depth of the mounting hole **71** is less than the height of the connection member **1**, so that during the mounting process, the locking fastener **2** and the connection member **1** can be directly locked to prevent the connection member **1** from being dislodged from the mounting hole **71**. It is also realized that the locking degree does not need to be controlled during the assembly process, thereby improving production efficiency. At the same time, by setting a spacer **3** between the locking fastener **2** and the mounting portion **7**, the friction force between the locking structure **200** and the lamp **300** can be increased, and the stability of the connection between the locking structure **200** and the lamp **300** can be improved. Through the locking connection between the locking fastener **2** and the connection member **1**, the use of thread glue during the assembly process is avoided, and the production cost of the track light **100** is saved.

[0043] The purpose of this disclosure is to provide a track light to solve the problem of difficulty in controlling the degree of locking when installing existing locking structures and lamps.

[0044] To achieve the above objective, the present disclosure provides a track light, including a track, a lamp and a locking structure connecting the track and the lamp, wherein the locking structure includes a locking member for insertion into the track, a connection member rotatably connected to the lamp, a spacer and a locking fastener, the lamp is provided with a mounting portion and a mounting hole passing through the mounting portion, the connection member passes through the mounting hole and extends beyond a lower surface of the mounting portion, the locking fastener is inserted into the connection member from lower to upper and is locked and fixed with a terminal end of the connection member, the spacer is sleeved outside the terminal end of the connection member and is pressed and fixed between the lower surface of the mounting portion and the locking fastener.

[0045] Optionally, the locking fastener includes a locking shaft and a locking head fixedly connected to the locking shaft, the terminal end of the connection member is provided with a concave locking hole, the locking shaft is inserted into the locking hole such that the locking head abuts against the connection member, the spacer is disposed between the locking head and the

mounting portion.

[0046] Optionally, the spacer is an elastic spacer, in a free state, a thickness of the spacer is greater than a distance between the locking head and the mounting portion.

[0047] Optionally, in an insertion direction of the locking fastener, a difference between a height of the connection member and a depth of the mounting hole is  $0.9\text{ mm}\pm 0.2\text{ mm}$ .

[0048] Optionally, the locking structure further includes a handle connected to the connection member, and the mounting portion further includes a rotation space in communication with the mounting hole, the handle is received in the rotation space and rotatable with the connection member as an axis in the rotation space.

[0049] Optionally, the handle includes a grip portion and a rotating portion, the rotating portion is fixedly connected to the connection member, the grip portion extends outward from the rotating portion to push the rotating portion and the connection member to rotate relative to the mounting portion.

[0050] Optionally, the rotating portion is located between the locking member and the connection member, and the connection member extends from the rotating portion toward the locking fastener in a tapered manner.

[0051] Optionally, the locking member and the connection member are coaxially arranged and are separately arranged on both sides of the handle.

[0052] Optionally, the track includes a sliding groove and a blocking tab, the blocking tab covers part of the sliding groove to form a through groove on the track in communication with the sliding groove, the locking member passes through the through groove and is received in the sliding groove, the locking member abuts against the blocking tab.

[0053] Optionally, the locking member includes a rotating shaft portion and an abutment portion provided on the rotating shaft portion, the rotating shaft portion passes through the through groove, and the abutment portion is configured to rotate synchronously with the connection member, so as to be received in the sliding groove and to abut against the blocking tab, or disengage from the sliding groove.

[0054] Optionally, two blocking tabs are provided and arranged opposite to each other, the through groove is formed between two blocking tabs, and two abutment portions are also provided and arranged opposite to each other to abut against the two blocking tabs.

[0055] The beneficial effect of the present disclosure is: in the locking structure of the present disclosure, by setting the connection member extend beyond the lower surface of the mounting portion after passing through the mounting hole, that is, the depth of the mounting hole is less than the height of the connection member, so that during the mounting process, the locking fastener and the connection member can be directly locked to prevent the connection member from being dislodged from the mounting hole. At the same time, by setting a spacer between the locking fastener and the mounting portion, the friction force between the locking structure and the lamp can be increased, and the stability of the connection between the locking structure and the lamp can be improved.

[0056] The above examples are only used to illustrate the technical scheme of the application, but not to limit it. Although the application has been described in detail with reference to the examples, it should be understood by those skilled in the art that the technical scheme of the application can be modified or replaced by equivalents without departing from the spirit and scope of the technical scheme of the application.

## Claims

1. A track light, comprising: a track, a lamp and a locking structure connecting the track and the lamp, wherein: the locking structure comprises a locking member for insertion into the track, a connection member rotatably connected to the lamp, a spacer and a locking fastener, the lamp is

provided with a mounting portion and a mounting hole passing through the mounting portion, the connection member passes through the mounting hole and extends beyond a lower surface of the mounting portion, the locking fastener is inserted into the connection member from lower to upper and is locked and fixed with a terminal end of the connection member, and the spacer is sleeved outside the terminal end of the connection member and is pressed and fixed between the lower surface of the mounting portion and the locking fastener.

**2.** The track light according to claim 1, wherein the locking fastener comprises a locking shaft and a locking head fixedly connected to the locking shaft, the terminal end of the connection member is provided with a concave locking hole, the locking shaft is inserted into the locking hole such that the locking head abuts against the connection member, and the spacer is disposed between the locking head and the mounting portion.

**3.** The track light according to claim 2, wherein the spacer is an elastic spacer, in a free state, a thickness of the spacer is greater than a distance between the locking head and the mounting portion.

**4.** The track lamp according to claim 1, wherein in an insertion direction of the locking fastener, a difference between a height of the connection member and a depth of the mounting hole is  $0.9\text{ mm} \pm 0.2\text{ mm}$ .

**5.** The track light according to claim 1, wherein the locking structure further comprises a handle connected to the connection member, and the mounting portion further comprises a rotation space in communication with the mounting hole, and the handle is received in the rotation space and rotatable with the connection member as an axis in the rotation space.

**6.** The track light according to claim 5, wherein the handle comprises a grip portion and a rotating portion, the rotating portion is fixedly connected to the connection member, and the grip portion extends outward from the rotating portion to push the rotating portion and the connection member to rotate relative to the mounting portion.

**7.** The track light according to claim 6, wherein the rotating portion is located between the locking member and the connection member, and the connection member extends from the rotating portion toward the locking fastener in a tapered manner.

**8.** The track light according to claim 5, wherein the locking member and the connection member are coaxially arranged and are separately arranged on both sides of the handle.

**9.** The track light according to claim 1, wherein the track comprises a sliding groove and a blocking tab, the blocking tab covers part of the sliding groove to form a through groove on the track in communication with the sliding groove, the locking member passes through the through groove and is received in the sliding groove, and the locking member abuts against the blocking tab.

**10.** The track light according to claim 9, wherein the locking member comprises a rotating shaft portion and an abutment portion provided on the rotating shaft portion, the rotating shaft portion passes through the through groove, and the abutment portion is configured to rotate synchronously with the connection member, so as to be received in the sliding groove and to abut against the blocking tab, or disengage from the sliding groove.

**11.** The track light according to claim 10, wherein two blocking tabs are provided and arranged opposite to each other, the through groove is formed between two blocking tabs, and two abutment portions are also provided and arranged opposite to each other to abut against the two blocking tabs.

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