United States Patent

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[54] **CONNECTING BOXES INCLUDING SWITCHING MEANS FOR ILLUMINATING DEVICES**
2 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **200/51,** 339/75
[51] **Int. Cl.** **H01r 13/70**
[50] **Field of Search** ..... 200/51, 21, 21S, 22, 22b, 22T, 23, 75(Digests)

[56] **References Cited**

UNITED STATES PATENTS

3,295,093	12/1966	Neumann et al.	200/51
3,503,032	3/1970	Routh et al.	339/215X

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ABSTRACT: A lighting device with hollow supporting ledges to be secured in, or spaced apart from a securing face, said lighting device which comprises supporting ledges defining a hollow space open in lateral direction. Conducting bars are accessible laterally and connect boxes having an upper setoff head portion and adapted for carrying lamps. The connecting boxes interchange with the supporting ledges and are equipped with a plurality of spring tongues. The spring tongues, projecting laterally in pairs from the upper setoff head portion, serve as holding tongues and the remaining tongues as contact tongues. A cam roller is transferable selectively into operative engaging positions or in an inoperative position. The cam roller is transferable into two of the operative positions. One of the operative positions leads the holding tongues into a preliminary locking position, and the other of the operative positions leads the holding tongues into their final locking position and leads simultaneously the contact tongues into their engagement position at the conducting bars.

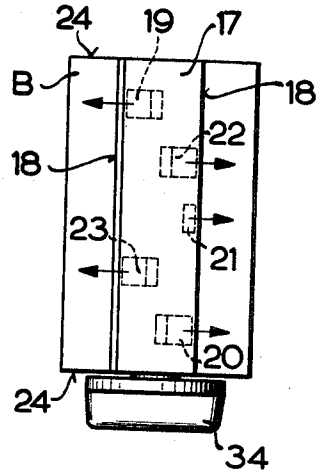

FIG. 1

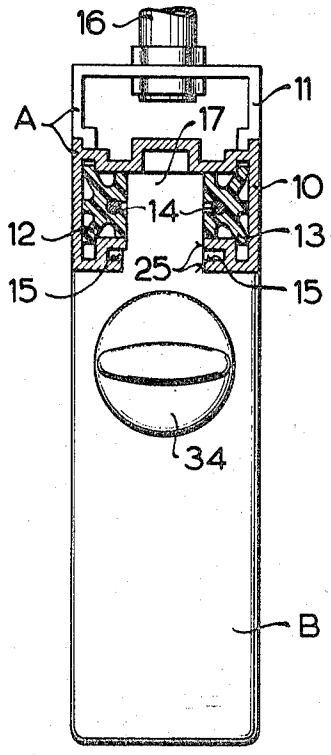

FIG. 2

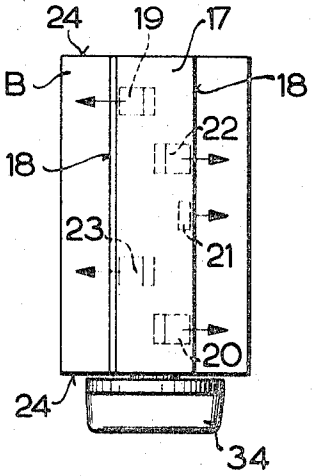

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FIG.3

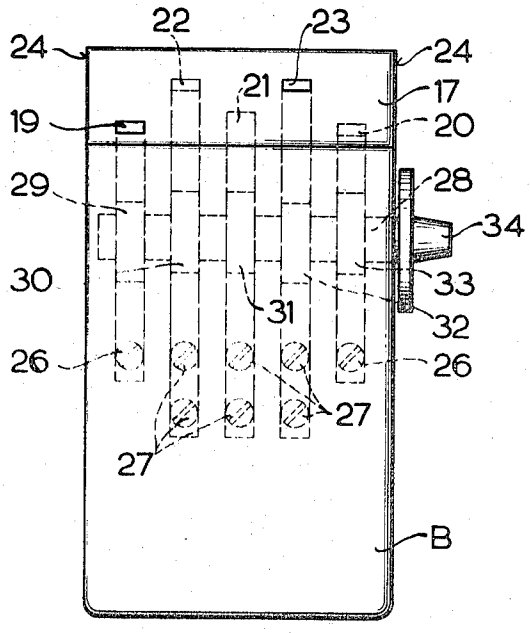

FIG.4

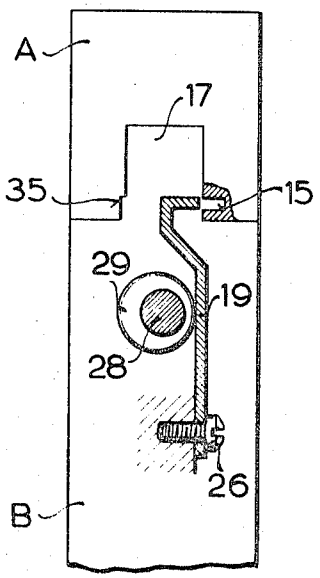

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FIG. 5

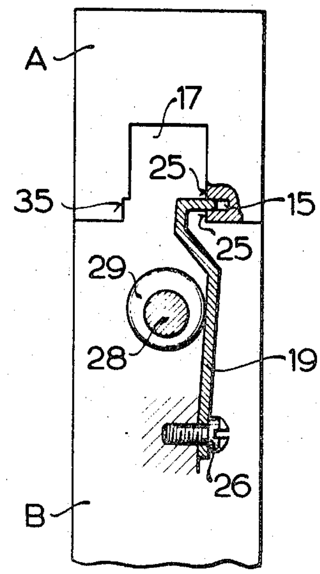
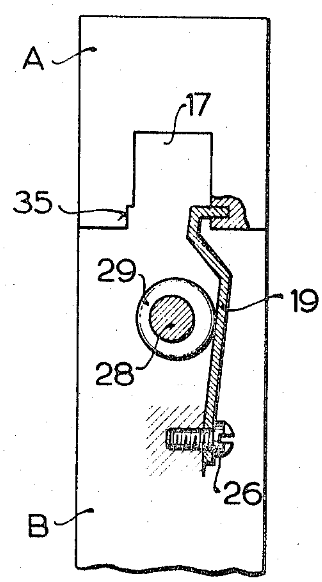


FIG. 6



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CONNECTING BOXES INCLUDING SWITCHING MEANS FOR ILLUMINATING DEVICES

The present invention relates to a lighting device, in general, and to such lighting device having hollow supporting ledges to be secured in, on or at a distance from a supporting face, which supporting ledges are open towards one side and receive conducting rails accessible in the hollow space from one side and are equipped with connecting boxes for carrying lamps which enter with an upper setoff head part into the supporting ledges and are equipped with a plurality of spring tongues. The spring tongues project laterally from the setoff head part as holding tongues in pairs, and serve also as contact tongues and are transformable by means of a cam roller switchable by means of a switching lever sitting on the outside connecting box selectively into an engagement or ineffective position.

Such lighting devices are used particularly in large spaces as department stores, museums, or the like. They have the advantage that the connecting boxes for the lamps on the hollow supporting ledges secured to the sealing of the space can be inserted at any selected position into the hollow supporting ledges and be securely clamped therein. One is even in the position in connection with this lighting device, to vary a lighting arrangement by releasing, displacing and clamping again of the connecting boxes. This case occurs, for instance, if in a museum hall, the exhibited objects are newly arranged.

The known lighting devices of the first-mentioned type have in the setoff head portion of the connecting box two or two pairs of contact tongues, which, upon rotation of the switching clamps are transmitted from their inoperative position within the connecting box into an inoperative position. They emerge then at the end sides of the head portion of the connecting box and reach thus the conducting bars of the supporting ledges, whereby the electrical connection to the lamp is established. In the vertical longitudinal center axis these connecting boxes have a pair of holding tongues, which emerge at opposite sides of the head portion and cooperate with a metallic supporting ledge. These tongues serve in the known lighting device simultaneously as holding tongues and as grounding contacts. This security of the connecting boxes in the supporting ledges is not satisfactory, because by lateral pressure, pull or tipping the connecting boxes can be pushed out from the connection boxes in spite of the holding tongues from the supporting ledges.

It is another object of the present invention to provide a lighting device of the above-stated type, and in particular such device which permits an easier handling as well as a better mechanical and electrical connection.

It is still another object of the present invention to provide a lighting device in which a cam roller has in addition to its ineffective, inoperative position two additional switching positions, of which one transforms the holding tongues alone into a preliminary locking position, while in the last switching position the holding tongues are transmitted into their end locking position and simultaneously, the contact tongues are transformed into their engaging position on the contacting bars.

By these totally three switching positions, the handling of the lighting device is appreciably improved: In the ineffective first position of the cam drum, neither the holding tongues nor the holding tongues nor the contact tongues emerge from the head portion of the connecting boxes. One can, therefore, in this first position, as until now, insert the head portion of each connecting box from the open side into the hollow supporting ledges.

If now the switching roller is moved into the second switching position, the holding tongues alone, not, however, the contact tongues, are transformed into a preliminary locking position. This preliminary locking position means, that the holding tongues enter into coordinated recesses in the holding supporting ledges, yet are not yet rigidly pressed therein. By this arrangement, one is put in the position to insert one or a plurality of connecting boxes, at first loosely, yet secured against fallout, into the supporting ledges, so that one

can selectively displace the same therein. The elected connection is, however, not yet established.

Only in the third and last switching position of the cam roller, not only the holding tongues are solidly pressed against the supporting ledge, in order to lock the connecting boxes in their prevailing positions in the hollow supporting ledges by resilient clamping, rather in the third switching position also the contact tongues enter into their engagement position to the conducting bars.

It is of advantage, if the holding tongues are disposed around the corner by arranging the same near the outer ends of the side faces of the connecting boxes, whereby always one holding tongue is provided on one side and another holding tongue on the opposite side of the head portion. This new arrangement of the holding tongues angularly offset, in contrast to the known arrangement in the longitudinal center plane of the connecting boxes has the advantage, that the holding tongues of the connecting boxes engage at two positions as much as possible remote from each other in longitudinal direction of the supporting bars. The previous danger that by lateral pull or pressure or by tipping the connecting boxes can be removed in spite of the preliminary locking from the holding bars, does not occur any more in connection with the new lighting device with connecting holding tongues disposed angularly offset.

With these and other objects in view, which will become apparent in the following detailed description, the present invention, which is shown by example only, will be clearly understood in connection with the accompanying drawings, in which:

FIG. 1 is an end elevation of a lighting device partly in section through the supporting ledge;

FIG. 2 is a top plan view of a connecting box alone;

FIG. 3 is a side elevation of the connecting box; and

FIGS. 4 to 6 are fragmentary schematic end views of the supporting ledge and the connecting box, the front wall of which is removed for better demonstration and in particular shown in three different switching positions.

Referring now to the drawings, and in particular to FIGS. 1—3, the lighting device comprises by example two main parts, namely a supporting ledge A and a connecting box B.

The supporting ledge A which is best recognizable in FIG. 1, comprises in the embodiment presented as example two ledge parts **10** and **11**, of which the ledge part **10** has generally a U or Ω-shaped cross section. The ledge part **10** receives in its hollow space, accessible from below by a longitudinal slot, two ledges **12** and **13** of insulating material, for instance, synthetic material, which have a longitudinal groove, which point towards each other and to a vertical longitudinal center plane of the supporting ledge part **10** and receive each a conducting bar **14**. These conducting bars **14** extend over the entire length of the supporting ledge part **10** and are connected to the current net and thus feed current. Near the edges of the downwardly directed slot opening, the supporting ledge part **10** has a groove **15** projecting through in longitudinal direction. The two grooves **15** point towards each other and to the vertical longitudinal center plane of the supporting ledge part **10**, respectively. A supporting ledge profile **11** serving as a cover covers up the supporting ledge part **10** from above. The supporting ledge parts **10** and **11** are connected with each other, for instance, by screwing. The supporting ledge part **11** receives at its top one or a plurality of tubes **16**, with which the supporting ledge A can be suspended at a distance from and below a ceiling (not shown). One can, however, also set the supporting ledge A directly below the ceiling or embed the same therein.

Each connecting box B has a generally basic design like a parallelopiped, it is, however, stepwise set off in its width at the upper head end **17** cooperating with a supporting ledge A and has thus in the head portion **17** a lesser width than in the main portion. At the sidewalls **18** of the head part of the connecting box are provided bores, through which end parts of, by example, totally five tongues **19**, **20**, **21**, **22** and **23** can enter from the inside towards the outside.

The two outer tongues 19 and 20 serve as so-called holding tongues. They are disposed close to the end faces 24 of the connecting box B and are set off angularly. A holding tongue 19 is disposed thereby on one side (FIG. 3) in the front to the left, the second holding tongue 20 is disposed in the rear to the right.

The holding tongues 19 and 20 have, as can be ascertained in FIG. 4 an angularly shaped end part, with which they cooperate with the two grooves 15 with the connecting box B inserted into the supporting ledge part 10.

In the center of one of the two side faces of the connecting box B a tongue 21 formed as a flat contact is provided, which cooperates in case of the connecting box B being inserted into the supporting ledge A with a metallic blank inner face 25 of the supporting ledge part 10 and serves as a ground contact (FIGS. 1 and 5). If thus the supporting ledge 10 consists, by example, of an anodized light metal, then by removal of the anodized layer, the contact faces on the supporting ledge part 10 become electrically conducting.

Within the range between the outer holding tongues 19 and 20 and the grounding flat contact tongue 21 disposed in the center, in the example, two further tongues 22 and 23 are provided, which serve as contact tongues and cooperate with the two conducting bars 14 of the supporting ledge A. The contact tongues 22 and 23 are disposed always on the side of the connecting box B pointing away from the holding tongues 19 and 20. This has the purpose of distributing equally the occurring forces during the later outwardly struddling of the contact tongues 22 and 23 and the holding tongues 19 and 20. The contact tongues 22 and 23 are exactly as the holding tongues 19 and 20 and in contrast to the grounding flat contact 21 equipped with outwardly directed angular arrangements.

Holding tongues 19 and 20, contact tongues 22 and 23 and the grounding tongue 21 extend, as can be best ascertained from FIG. 3 from the stepwise setoff head portion 17 of each connecting box B into its lower part, where the holding tongues 19 and 20 are secured by a screw 26 while the grounding tongue 21 and the contact tongues 22 and 23 are equipped with connecting terminals 27. These connecting terminals serve the electric conducting connection of the grounding tongue 21 and of the contact tongues 22 and 23 with the actual locking device (not shown), which, in known manner, is received by the connecting box B or is supported thereby. For this purpose, each connecting box B has in the bottom exit opening for the conduits to the lighting device.

Between the end parts of the grounding contact 21, the holding contacts 19 and 20, or the contact tongues 22 and 23 and the head portion of the connecting box B and their terminals 26 and 27 therein, a cam roller 28 is provided in the connecting box B which has for each tongue 19 to 23 its own switching cam 29—33. The cam roller 28 is rotatable by means of a switching knob 34 and in particular in three different positions, each of which can be locked which are indicated in FIGS. 4—6, as the example of one of the two holding tongues 19.

In the position 1 (FIG. 4), the cam roller 28 is with its switching cams 29—33 in a zero or inoperative position. In this position all switching cams have their lowest height relative to the cam drum axis. The holding tongues 19 and 20, the grounding tongue 21 and the contact tongues 22 and 23 are disposed thereby and due to their own resiliency such on their switching cams 29—33, that neither the grounding tongue 21, nor the holding tongues 19 and 20, nor the contact tongues 22 and 23 project laterally from the head portion 17 of the connecting box B. In this position, the head portion 17 of the connecting box B can be inserted without any difficulty into the slot of the supporting ledge part 10, whereby a onesided step 35 at the head part 17 of each connecting box B and on the supporting ledge part 10 in known manner takes care that each head part 17 is inserted nonexchangeably. The purpose of this measure is to take care of the fact that upon insertion of the connecting box into the supporting ledge A, the grounding flat contact 21 engages the metallic blank position 25 of the supporting leg part 10.

In the position corresponding with FIG. 5, by corresponding design of the switching cams 29 to 33 of the cam roller 28 only the holding tongues 19 and 20 are guided outwardly from the head part 17 of each connecting box B and in particular into a preliminary locking position. This means that between the end edge face of the end parts of the holding tongues 19 and 20 and the base of the grooves of the supporting ledge part 10 a certain free space remains. One can, therefore, displace each connecting box B within the supporting rail A in the longitudinal direction thereof, as long until the correct position is obtained. Since the holding tongues 19 and 20 in the mentioned position (FIG. 5) engage already one part into the grooves 15, the connecting boxes B cannot fall out from the supporting ledge A. By this possibility, the position of each connecting box B in the supporting ledge A still to be variable, however, no current conducting connection is provided, since in this position exclusively the holding tongues 19 and 20 project from the head portion 17 of the connecting box B.

This currentless displacing possibility has not only advantages during the first mounting of the lighting device. One is rather in the position at any time later to vary the position of each individual connecting box B relative to the supporting ledge A, whereby the connecting boxes B are without current and are secured against fall out from the supporting ledge A.

In a third position finally (FIG. 6), the cams 29—33 of the cam roller 28 stand in their outermost position. In this position, by corresponding design of the grounding tongue switching cam 31 of the cam roller 28, the grounding tongue 21 is running ahead to the metallic blank parts 25 of the supporting ledge A, in order to render effective the protection grounding as early as possible, by all means, however, before the contact tongues 22 and 23 bring about a current-conducting connection. Furthermore, during transforming of the cam roller 28 from the previous switching position into the third switching position, the holding tongues 19 and 20 are forcibly pressed into the grooves 15 of the supporting ledge part 10 and are thereby bent through resiliently. In this manner, the connecting boxes B after they assume their correct position relative to the supporting ledge A, are locked by spring clamping in the grooves 15 of the supporting ledge A.

Simultaneously, however, also the contact tongues 23 are, slightly running behind, pressed outwardly by the switching cams 30, 32 from the head part 17 of the connecting box B at opposite sides. They arrive thereby at the contact wires 14, so that between the latter and the lighting bodies connected with the connecting box B a current-conducting connection is produced.

The arrangement of the holding tongues 19 and 20 at the connecting box B angularly offset next to the ends 24 of the head portion 17 has the advantage that in this manner, the attacking points of the holding tongues 19 and 20 are disposed far apart from each other. One can, therefore, no more remove the connecting boxes B, as previously, by pressure, pull or tipping from the supporting ledge A. The arrangement of the contact tongues 22 and 23 on the side faces pointing away from the holding tongues 19 and 20 has the advantage that in the third switching position the holding tongues 19 and 20 and the contact tongues 22 and 23 assume better the occurring forces, since they are disposed in pairs angularly offset.

One can, in the framework of the present invention, provide two pairs of conducting rails 14 instead of the two oppositely disposed conducting rails 14 and also provide then in the connecting box B instead of the two contact tongues 22 and 23 two pairs, in order to permit, if so desired the working with polyphase current.

While I have disclosed one embodiment of the present invention, it is to be understood that this embodiment is given by example only and not in a limiting sense.

I claim:

1. A lighting device to be secured in, or spaced apart from a securing face, comprising:

a supporting ledge comprising hollow supporting ledge parts, one of said ledge parts defining a hollow space open in lateral direction;

conducting bars received in said hollow space and accessible laterally from the inside of said one ledge part, connecting boxes having an upper setoff head portion and adapted for carrying lamps, each of said connecting boxes interengaging with said supporting ledge parts and equipped with a plurality of spring tongues;

said spring tongues, projecting laterally in pairs from said upper setoff head portion, serve as holding tongues and the remaining tongues as contact tongues;

a cam roller on each connecting box transferable selectively into operative engaging positions or in an inoperative position;

said cam roller being transferable into two of said operative positions;

one of said operative positions leading said holding tongues into a preliminary locking position; and

the other of said operative positions leading said holding tongues into their final locking position and leading simultaneously said contact tongues into their engagement position at said conducting bars.

2. The apparatus, as set forth in claim 1, wherein said holding tongues are angularly setoff relative to each other by arranging the latter near the outer ends of side faces of each of said connecting boxes, whereby one of said holding tongues is disposed on one side of said head portion and the other of said holding tongues is disposed on the opposite side of said head portion.