Jan. 9, 1945. P. A. CARSON 2,367,003

LAMP CHANGER

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Fig. 1.

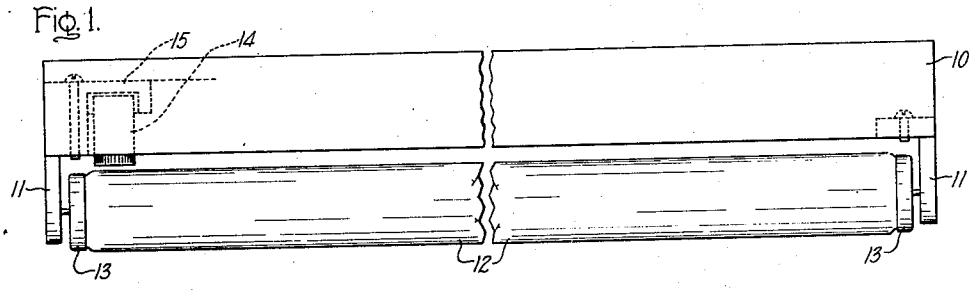


Fig. 2.

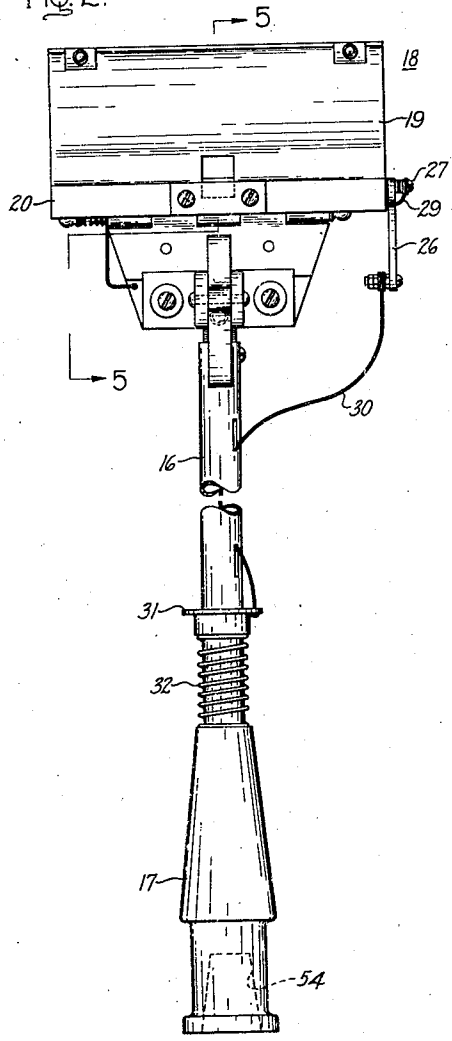


Fig. 3.

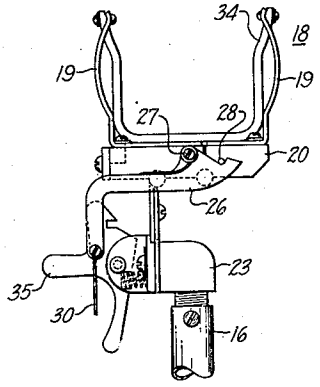
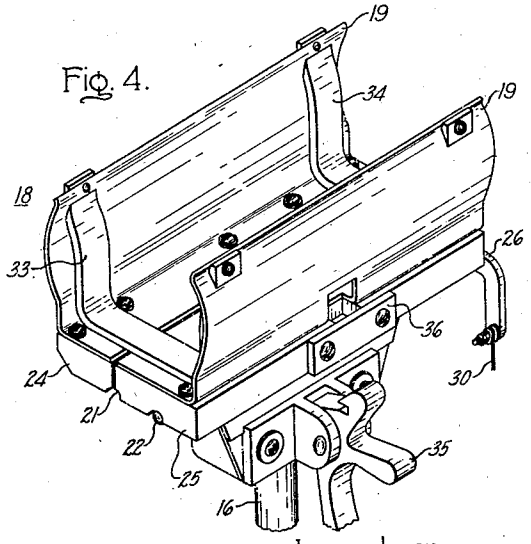


Fig. 4.



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Fig. 5.

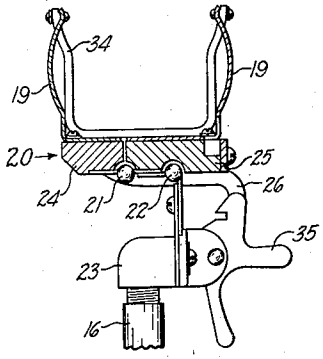


Fig. 6.

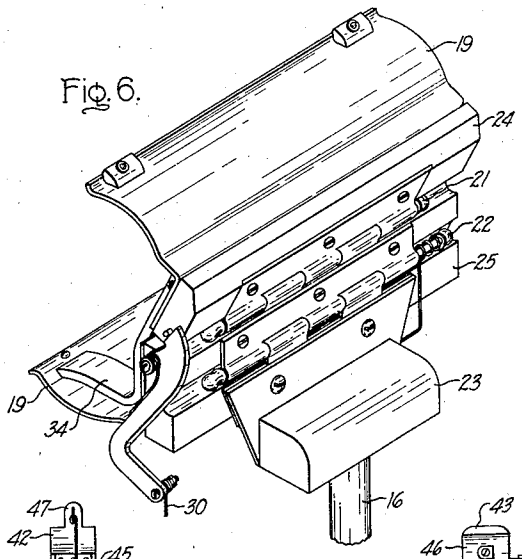


Fig. 7.

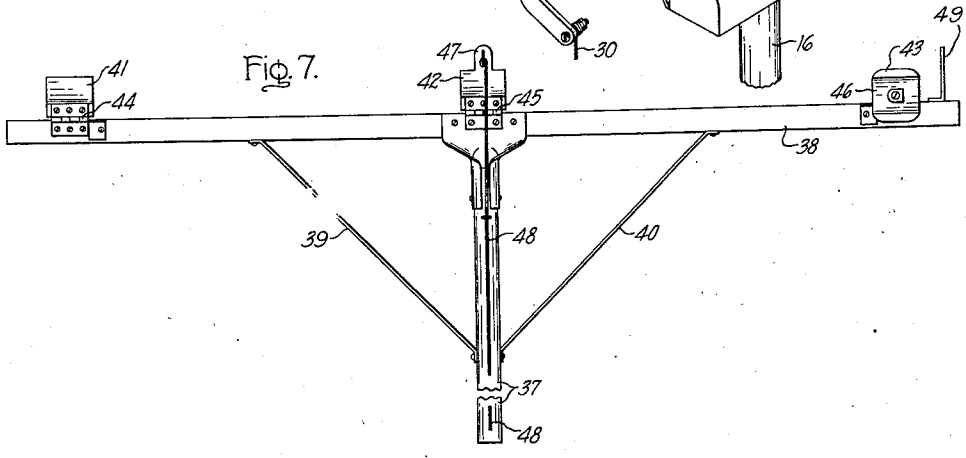
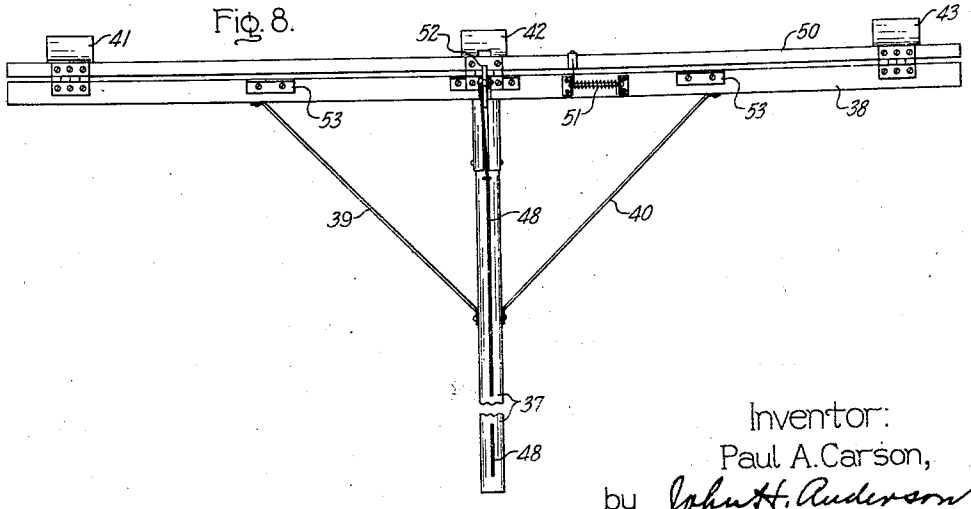


Fig. 8.



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2,367,003

LAMP CHANGER

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Application September 9, 1942, Serial No. 457,779

3 Claims. (Cl. 294—20)

My invention relates to a device for moving elongated electric discharge lamps, such as fluorescent lamps, and the starting switches therefor into and out of engagement with the supporting means extensively used for such lamps and switches.

Fluorescent lamps now in commercial use are provided with a pair of spaced contact pins at each end for insertion in sockets constructed and arranged to accommodate the pins and to support the lamp. The contact pins are disposed in a common plane and the usual type of socket is provided with a slot into which the pins are inserted by moving the lamp transverse to its longitudinal axis. The lamp is then rotated 90° about said axis to releasably lock the lamp in the sockets. Removal of the lamp is effectuated by the same steps in reverse order. Sockets of this type are disclosed in the U. S. Reissue Patent 21,545, issued August 27, 1940, to A. J. Marshaus. Similarly, the starting switch is incorporated in a unit which is first inserted in an adapter or supporting member and then rotated to lock it in position in said member as described in the U. S. Patent 2,276,829, issued March 17, 1942, to F. C. DeReamer.

An object of my invention is to provide a simple, effective device, hereinafter called a lamp changer, for mounting and removing such lamps and switches. Other objects and advantages of the invention will appear from the following detailed description of species of the invention and from the drawings in which Fig. 1 is a side elevational view of a conventional fixture showing an electric discharge lamp and a starting switch unit mounted therein, Fig. 2 is a front elevational view of a species of lamp changer embodying my invention, Fig. 3 is an end view of the head of the same, Fig. 4 is a perspective view of said head, Fig. 5 is a sectional view along the line 5—5 of Fig. 2 showing the head in one of its effective positions, Fig. 6 is a perspective view of the head in its lamp releasing position, Fig. 7 is a front elevational view of another species of lamp changer, and Fig. 8 is a similar view of another species thereof. Like numbers denote like parts in all the figures.

The ceiling-mounted lighting fixture shown in Fig. 1 for the purpose of illustrating a use of the invention comprises an elongated housing 10 supporting oppositely facing sockets 11 mounted at opposite ends thereof. The sockets 11 are so spaced as to permit the insertion of the elongated electric discharge lamp 12 which is provided with a two-pin base 13 at each end thereof. The lamp 12 is mounted in the fixture by aligning the pins with a vertical slot in each of the sockets 11, moving the lamp 12 upward into the socket and then rotating the lamp approximately 90° about its longitudinal axis to effectively lock the lamp in the socket. This is the conventional arrangement in extensive commercial use at the present time. The lamp 12 may be either a fluorescent lamp or a lamp capable of emitting ultraviolet radiations of selected wavelengths; both types of lamps are commercially available. The housing 10 also accommodates a switch unit 14 which is mounted in said housing by inserting the unit 14 into an adapter 15 secured to the housing 10 and thereafter rotating said unit 14 to lock it in position. The lamp 12 and the unit 15 are readily removable by rotating these members in the holders to effect their release.

The lamp and switch changer illustrated in Fig. 2 is of particular utility when the fixture illustrated in Fig. 1 is mounted on or adjacent the ceiling where it cannot be reached by hand. The lamp changer comprises a hollow rod or shaft 16 having a hand grip 17 at one end thereof and a lamp gripping head or clamp 18 at the opposite end thereof. The length of the shaft depends upon the hanging height of the fixture—a length of approximately 4 to 6 feet is suitable in most instances. The clamp 18 comprises a pair of spaced, resilient jaws 19 mounted on a support member 20. The jaws 19 are spaced sufficiently and shaped to accommodate the tubular envelope of the lamp 12 and exert a clamping action on said envelope. The support member 20 is hinged at 21 (Fig. 5) so that the jaws 19 may be further separated to release the lamp as shown in Fig. 6 and is secured to the shaft 16 by the spring hinge 22 bolted to the member 23 which is internally threaded to screw onto the externally threaded end of said shaft 16.

The support 20 comprises two hinged sections 24 and 25 which are disposed in a common plane (Figs. 3 to 5) when the clamp 18 grips a lamp envelope—the spring actuated latch 26 engaging with said sections 24 and 25 and holding them together in said plane. Said latch 26 is secured to the pivot 27 on said section 24, as shown in Figs. 2 and 3, and is forced against the pin 28 on said section 25 by the spring 29 secured to the pivot 27 and pressing on the portion of the latch 26 away from the section 25. The force exerted by the spring 29 on the lever 26 is sufficient to move the jaws 19 from the lamp releas-

ing position (shown in Fig. 6) to the lamp gripping position thereof (shown in Figs. 2 to 5).

The force exerted by the spring 29 may be overcome and the latch 26 released to permit separation of sections 24 and 25 and therewith jaws 19 by pulling control wire 30 which is secured to the free end of said latch 26. Said wire 30 passes through the shaft 16, as shown in Fig. 1, and is fastened to the slidable finger grip 31 mounted on said shaft 16 adjacent the hand grip 17. A spring 32 is interposed between said grip 31 and said hand grip 17 for normally spacing these members. Two parallel, spaced strips 33 and 34 of flexible, compressible material having a good gripping surface, such as soft rubber strips, are disposed transversely in the clamp 18 with the ends thereof passing through and secured, as by being bolted, to the free edge portions of the jaws 19. The strips 33 and 34 are thus interposed between the lamp envelope and the other elements of the clamp 18.

The spring hinge 22 is secured to said section 24 and tends to support the clamp 18 with the common plane of the sections 24 and 25 normal to the longitudinal axis of the shaft 16. The hinge 22 is so constructed and arranged, however, that the clamp 18 can be rotated 90° to bring the aforesaid common plane of the sections 24 and 25 parallel to the longitudinal axis of the shaft 16.

A spring latch 35 is secured to the member 23 (as shown in Figs. 3 and 4) and engages with the catch 36 mounted on the section 25 of the clamp 18 when said clamp is rotated 90° from the position shown in Figs. 2 and 3. The jaw 19 and the section 25 are cut away at this part to accommodate the top of the engaging portion of the latch 35. The latch 35 holds the section 25 against the force exerted by the spring hinge 22 in the position shown in Fig. 6 until it is released. The clamp 18 is then moved back to the position shown in Figs. 2 to 5 by the spring hinge 22.

The end of the hand grip 17 is recessed as shown in dot-dash lines at 54 in Fig. 2 and has an internal depth and diameter of sufficient size to permit it to be slipped over and to grip the exposed end of the starting unit to turn the latter into or out of the adapter 15.

To remove the lamp 12 from the lighting fixture shown in Fig. 1, the jaws 19, latched and in the position shown in Figs. 2 to 5, that is, with the plane of support 20 normal to the longitudinal axis of the shaft 16, are thrust against the lamp 12 by said shaft 16 to engage and firmly grip the lamp envelope. The axis of the shaft 16 is vertical so that the thrust is exerted transversely to the lamp axis. The lamp 12 is then rotated 90° about its longitudinal axis to align the pins on the bases 13 with the slots in the sockets 11 by exerting a turning moment on said lamp. This is accomplished by moving the member 23 in an angular path about the longitudinal axis of the lamp 12 in the proper direction to turn support 20 on the hinge 22. Such movement is imparted to the member 23 by holding the hand grip 17 stationary with one hand and exerting a horizontal force with the other hand which grips the shaft 16 above the grip 17 to start the lamp 12 turning in the sockets 11. The shaft 16 is then moved upward until the latch 35 engages catch 36.

Usually the lamp 12 drops out of the sockets when the contact pins have been aligned with the socket slots, but in the event that the lamp sticks, which may be caused by too close spacing of the sockets, it may be pulled out of the fixture by the lamp changer since the latch 35 holds the support 20 in its turned position and the latch 26 prevents the jaws 19 from spreading. After the lamp has been removed from the fixture it may be released from the lamp changer by unlatching jaws 19.

A lamp may be mounted in the fixture with the aid of the lamp changer. In this operation the lamp is placed between the latched jaws 19, which are in the position with respect to shaft 16 shown in Figs. 2 to 5, with the contact pins on the bases 13 in a common plane including or parallel with shaft 16. The pins are slid into the slots in the sockets 11 and the lamp is then rotated approximately 90° in the same manner as that described above in removing the lamp. The jaws 19 are then unlatched by pulling down on wire 30 to permit the jaws 19 to separate as the shaft 16 is moved downward to remove the lamp changer from the lamp.

The lamp changer is useful for changing one or more lamps in a multiple lamp fixture even when the spacing between lamps is as small as one inch and the clearance between the lamps and the reflector as small as one-quarter of an inch.

To remove the switch unit 14 from the fixture, the lamp 12 is first removed and then the lamp changer is reversed to bring the hollow, recessed end portion of the hand grip 17 into engagement with the exposed end of said unit 14. A slightly tapered recess having its open end slightly larger and its closed end slightly smaller in diameter than the diameter of the switch unit is effective for gripping and turning the switch unit in the adapter 15 to effect its removal. A switch unit may be mounted in the adapter by forcing it into the hollow end portion of the hand grip 17, inserting and then turning it about its longitudinal axis in the adapter 15 and then pulling downward on the lamp changer to disengage it from the switch unit.

The embodiment of my invention illustrated in Fig. 7 of the drawings comprises a shaft or handle 37 having a transverse support member 38 rigidly secured thereto. Braces 39 and 40 maintain handle 37 and member 38 at right angles to each other. Three spring bronze clips or cradles 41, 42 and 43 which engage the fluorescent lamp are mounted in spaced relation on the member 38. The three clips 41, 42 and 43 are so mounted on hinges 44, 45 and 46 that they may be turned from the position of clips 41 and 42 to that of clip 43 shown in the drawings. The center clip 42 may be lined with material having a good gripping surface, such as soft rubber, for turning the lamp in its sockets. Said clip 42 is provided with a tongue 47 and a cord, wire, or string 48 to release the grip of the clip 42 on the lamp. A guide member 49 is provided at one end of the support member 38 to facilitate the engagement of the clips with a lamp mounted in a fixture and the insertion of the pins of a lamp mounted in the clips into the slots of the sockets 11.

The operation of mounting a lamp in a fixture is substantially the same as that described above in conjunction with Figs. 2 to 6, i. e., the lamp is first placed in the aligned clips which are in the position of clips 41 and 42 and is then inserted in the sockets. The lamp is then turned through 90° by a combined horizontal and upward motion of the handle 37 to turn the clips 41, 42 and 43 on the hinges 44, 45 and 46. The

lamp changer is disengaged from the lamp by pulling on the string **48** to spread the center clip and then moving the clips from about the lamp. In removing a lamp from a fixture, the lamp is first gripped by the three clips and then turned through 90°. The lamp then drops out of the sockets and is supported by the three clips. It may then be lowered to the level of the operator.

The embodiment illustrated in Fig. 8 is similar to that shown in Fig. 7 except that the three clips **41**, **42** and **43** are mounted on a hinged, rigid member **50** secured to the support member **38** so that said slips move as a unit. The hinged member **50** is held in the position shown in the drawings, that is, in position to grip a lamp to be removed from or inserted into a socket, by spring **51**, which is compressed when the hinged member **50** is rotated to turn the gripped lamp in its sockets. A latch **52** is also provided to lock the hinged member **50** after it has been rotated and rests on the stops **53**. This facilitates removal of a lamp having a tendency to stick in the sockets even when the pins on the base of the lamp are aligned with the socket slots.

From the foregoing, it is apparent that I have provided a lamp changer of simple structure comprising a lamp gripping means having spaced fingers pivoted on one end of an elongated support by which sufficient force may be exerted first normal to the lamp axis to bring the gripping means into engagement with said lamp and then offset from said axis to exert a turning mon nt on said lamp to interlock it with or to release it from conventional sockets.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A lamp changer for moving elongated lamps into and out of engagement with sockets of the type in which the lamp is interlocked therewith and released therefrom by rotation of the lamp about its longitudinal axis, said lamp changer comprising in combination, an elongated handle and means mounted on one end of said handle for gripping and holding said lamp with its longitudinal axis normal to the axis of said handle, said means being adapted for rotation on said handle in a plane parallel to the axis of said handle and normal to the longitudinal axis of the lamp gripped by said means whereby a turning moment is exerted on said lamp in said sockets when the end of said handle on which said means is mounted is moved in a plane normal to and in a direction offset from said lamp axis.

2. A lamp changer for moving elongated lamps into and out of engagement with sockets of the type in which the lamp is interlocked therewith and released therefrom by rotation of the lamp about its longitudinal axis, said lamp changer comprising in combination, an elongated handle and clamping means hinged on one end of said handle for gripping and turning said lamp about its longitudinal axis, the axis of rotation of said hinged means being substantially normal to the longitudinal axis of said handle whereby a turning moment is exerted on said lamp in said sockets when the clamp supporting end of said handle is moved in a plane normal to and in a direction offset from the axis of rotation of said means.

3. A lamp changer for moving elongated lamps into and out of engagement with sockets of the type in which the lamp is interlocked therewith and released therefrom by rotation of the lamp about its longitudinal axis, said lamp changer comprising in combination, an elongated handle and clamping means having separable jaws hinged on one end of said handle for gripping and turning said lamp about its longitudinal axis, the axis of rotation of said hinged means being substantially normal to the longitudinal axis of said handle whereby a turning moment is exerted on said lamp in said sockets when the clamp supporting end of said handle is moved in a plane normal to and in a direction offset from the axis of rotation of said means.

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