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DEVICE FOR INSTALLING AND REMOVING FLUORESCENT LIGHTING TUBES

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Fig. 1.

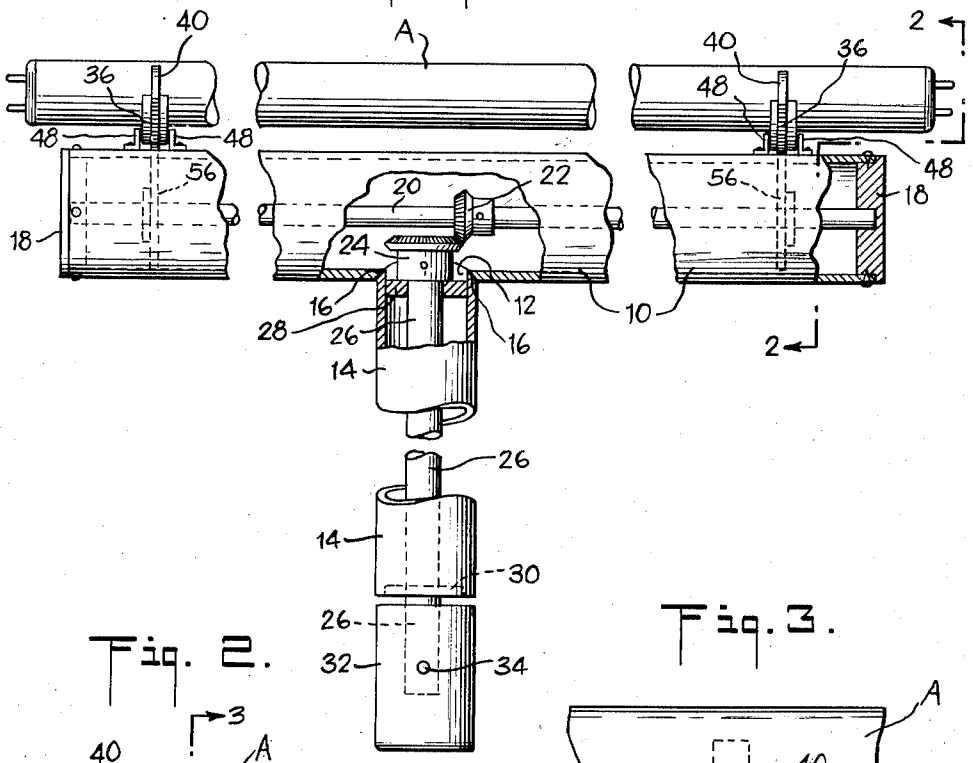


Fig. 2.

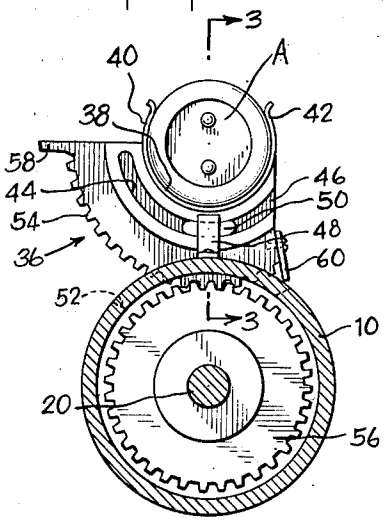
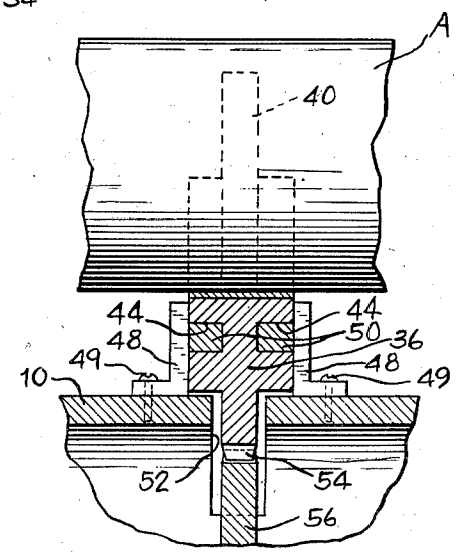


Fig. 3.



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DEVICE FOR INSTALLING AND REMOVING FLUORESCENT LIGHTING TUBES

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6 Claims. (Cl. 294—21)

This invention relates to a device by means of which one, without using a ladder, may readily install or remove a fluorescent lighting tube from an overhead fixture which is beyond normal reach.

Devices previously developed for the stated purpose have suffered serious drawbacks as, for example, complexity of structure, awkward operation, and non-utility with respect to a tube located closely adjacent to other tubes or to other structures. The objects of the present invention, therefore, are to provide such a device which, however, does not suffer the mentioned drawbacks.

A single embodiment of the present invention is shown, for illustrative purposes, in the accompanying drawing without, however, limiting the invention to that particular embodiment.

In the drawing:

Figure 1 is a side view, partly in elevation and partly in vertical section of a preferred embodiment of the present invention.

Fig. 2 is an enlarged, vertical, cross-sectional view substantially on the irregular line 2—2 of Fig. 1.

Fig. 3 is a further enlarged, vertical, central, sectional view substantially on the line 3—3 of Fig. 2.

The device, best generally understood from Fig. 1, comprises a T-shaped assemblage of a tubular, horizontal member 10 having an opening 12 formed in its wall, midway between its ends, and a tubular upright handle 14, the upper end of which is welded at 16 into the opening 12.

Opposite end plates 18, fixed into or upon the ends of member 10, to close the latter, serve as bearings supporting the opposite ends of a rotatable, horizontal shaft 20, located within horizontal member 10, and having non-rotatively fixed thereto, near the center thereof, a bevel gear 22, meshing with and driven by a bevel driving gear 24 which is non-rotatively fixed upon the upper end of a vertical shaft 26 supported within the upright handle 14 by bearing plates 28 and 30 which are tightly fixed into the upper and lower ends of said handle. A knob 32 is fixed by pin 34 to the lower end of shaft 26 so that one, holding the device in an upright position with one hand by handle 14, may turn the knob 32 with the other hand, thereby turning shafts 26 and 20 in either direction.

Similar assemblies are provided toward opposite ends of tubular, horizontal member 10 for gripping a fluorescent tube in horizontal position and for turning the thus-held fluorescent tube about its own longitudinal axis. Each such assembly comprises a segmental gear 36 having a partially circular flat-metal spring 38 fixed to an inner portion of gear 36 approximately concentric relatively to the latter's axis of rotation; and end portions 40, 42 of the spring are yieldable and have outwardly flared ends enabling a fluorescent tube to be forced into and to be held releasably within said spring.

The segmental gear 36 has similar arcuate grooves 44 formed in opposite side faces thereof, these grooves being open at corresponding ends 46 to permit said gear, during manufacture of the device, to be slid into association with similar opposed guide brackets 48 which are held rigidly by screws 49, or other suitable means, upon the top of horizontal member 10.

Integral with or fixed to the brackets 48 are inwardly extending guides 50 which, as viewed in elevation, are preferably in the shape of elongate, arcuate ovals of such size as to fit with an accurate, sliding fit within the grooves 44 and constrain the gear 36 to move only arcuately to any material extent.

At a point between the brackets 48, the tubular member 10 is slotted as at 52 and toothed portion 54 of the gear 36 extends through said slot and meshes with a gear wheel 56 fixed non-rotatively to shaft 20. The gear 36 has an integral finger 58 on one end and a separable finger 60 screwed thereto at its opposite end to positively limit the operational movement of said gear in either direction. Alternatively, pins or other suitable means may be employed for limiting such operational movement.

One wishing to use the device to install a fluorescent tube A in an overhead fixture, places the tube in its position, shown in Figs. 1 and 2, within the two springs 38, the spring fingers 40, 42 yielding to permit such insertion. Then, being certain that said spring fingers are in their positions shown in Fig. 2, turning knob 32, if necessary, to achieve such positioning, the user pushes the tube A vertically upwardly into its receptacles in a ceiling or overhead fixture. After thus getting the tube A into its receptacles, the user, while still using the device to hold said tube in its receptacles, turns the knob 32 to rotate said tube about its longitudinal axis sufficiently to lock the tube properly into its receptacles with its contacts properly engaging electric circuit contacts in the fixture, whereafter the user may withdraw the device free of the tube A, applying a somewhat sidewisely directed manual force, if necessary, as well as a downwardly directed manual force for the latter purpose. The spring fingers 40, 42, of course, yield to permit such withdrawal.

To remove such a fluorescent tube A from a fixture, the user merely pushes the device vertically upwardly to cause the springs 38, positioned as shown in Fig. 2, to grasp the tube, whereafter the knob is turned to unlock the tube from its receptacles; then, the device with the tube is lowered to separate the tube from the fixture.

It should be apparent that, in the described usage of the device, the handle 14 may be held with one hand and the knob 32 manipulated with the other hand. Obviously, also, the device here disclosed substantially avoids the shortcomings of devices previously employed for a similar purpose.

It will be understood that the concepts utilized in the disclosed embodiment may be employed with some variations without, however, departing from the invention as set forth in the following claims.

We claim:

1. A device for installing and removing fluorescent lighting tubes, comprising a T-shaped support having a horizontal top member and an upright handle member, segmental gear means mounted on said top member for back and forth rotation about an axis parallel to said top member, tube-holding means associated with said gear means for releasably holding a fluorescent tube in horizontal position for rotation of said tube relatively to said top member about an axis substantially coincident with the axis of rotation of said gear means, an operating knob inseparably associated with said handle member and movable relatively thereto, and driving gear means, carried by said support in driving relation to said segmental gear means and coacting with said knob to cause such rotation of a thus-held tube by manipulation of said knob; said segmental gear means comprising a segmental gear having an arcuate groove concentric relatively to a fluorescent tube thus held by said tube-holding means, and said

device, further, including a guide, rigidly associated with said top member, extending with an accurate sliding fit within said groove to restrain said segmental gear against material movement except about its own center of rotation.

2. A device according to claim 1, said top member and handle member being tubular and said driving gear means being within said members.

3. A device according to claim 1, said segmental gear having a pair of such arcuate grooves on opposite sides of the gear, and the device including a pair of such arcuate guides extending into said pair of grooves.

4. A device according to claim 1, said segmental gear having an arcuate, peripheral, toothed portion, and abutment fingers at opposite ends of said toothed portion and protruding radially outwardly therefrom for limiting rotation of the segmental gear in opposite directions.

5. A device according to claim 1, said groove having an open end, facilitating insertion of said guide endwisely into said groove.

6. A device according to claim 3, said grooves having corresponding open ends, said segmental gear having an arcuate, peripheral, toothed portion, and abutment fingers at opposite ends of said toothed portion and protruding radially outwardly therefrom for limiting rotation of the segmental gear in opposite directions; the abutment finger at the end of the toothed portion which corresponds to the open ends of said grooves being separably associated with the segmental gear to facilitate assembly of the latter with such guides and with said driving gear means.

No references cited.