Feb. 27, 1951 J. E. SPRENGER 2,543,607

FLUORESCENT LIGHT TUBE CHANGER

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FIG.1.

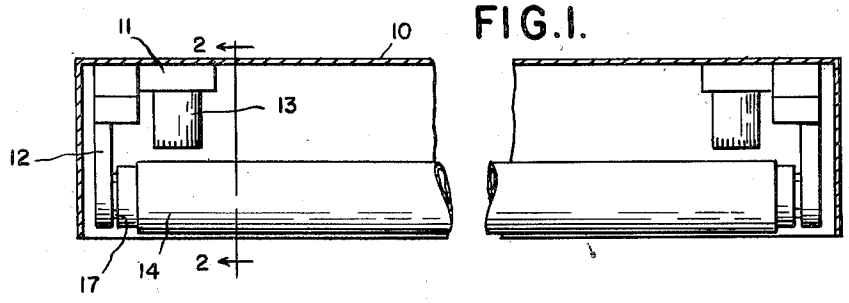


FIG.2.

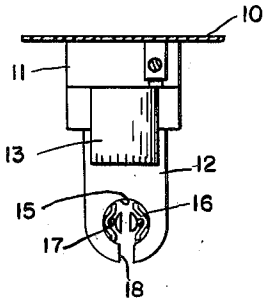


FIG.3.

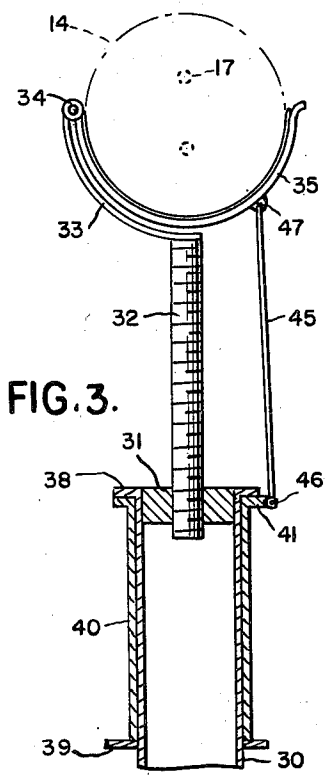
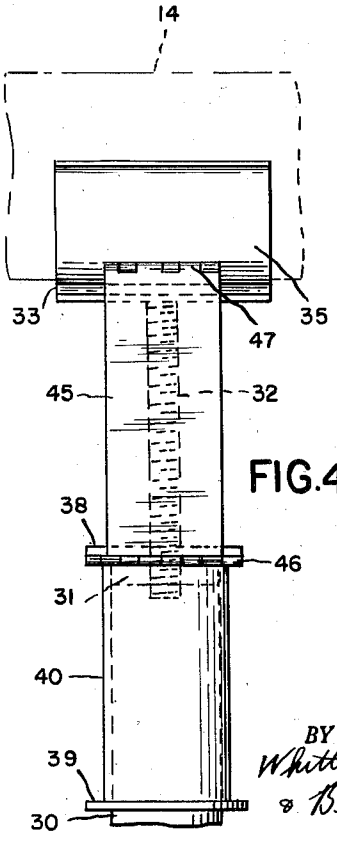


FIG.4.



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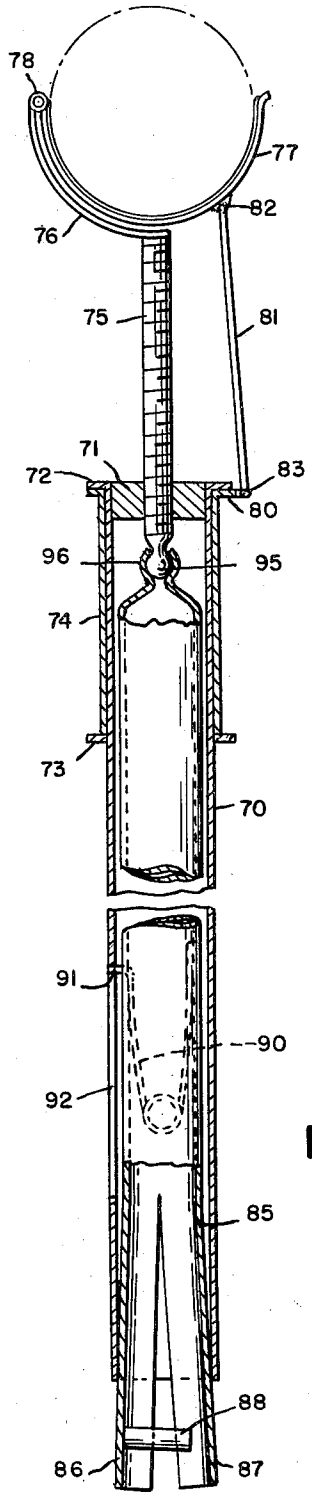


FIG. 5

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FLUORESCENT LIGHT TUBE CHANGER

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7 Claims. (Cl. 294—21)

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The present invention relates to a fluorescent light tube changer.

Fluorescent lighting has become very popular in recent years but one of the disadvantages lies in the difficulty which has been encountered in servicing the equipment. Normally the fixtures are supported adjacent the ceiling and in many installations including industrial usage the fixtures are at a relatively great height from the floor.

In order to insert the elongated fluorescent light tubes, the opposite ends thereof must be introduced into sockets and thereafter the tube rotated through 90° about a horizontal axis to bring the pins at the end of the tube into contact with the contacts provided in the sockets.

The present invention concerns itself with a tool adapted for use in replacing the light tube.

With the foregoing general remarks in mind, it is an object of the present invention to provide a tool effective to replace fluorescent light tubes.

It is a further object of the present invention to provide a combination tool having mechanism at one end for replacing fluorescent light tubes.

It is a feature of the present invention to provide mechanism for replacing fluorescent light tubes comprising a resilient tube gripping device including linkage for rotating said device through an angle of 90°.

More specifically, it is a feature of the present invention to provide a fluorescent light tube changer comprising a handle, a support movable longitudinally of said handle at one end, a resilient tube gripping member pivoted to said support, and a link interconnecting said member and said handle.

Other objects and features of the invention will become apparent as the description proceeds, especially when considered in conjunction with the accompanying drawings, wherein:

Figure 1 is a side elevation partly in section of a conventional fluorescent light tube fixture;

Figure 2 is a fragmentary section on the line 2—2, Figure 1;

Figure 3 is a side elevation partly in section of a tool for replacing fluorescent light tubes;

Figure 4 is a front elevation of the device shown in Figure 3;

Figure 5 is an elevation partly in section of a tube changer which incidentally includes mechanism for changing starters.

Referring now to Figure 1, there is illustrated a conventional fluorescent light tube fixture comprising a reflector 10, a starter receptacle 11, a light tube receptacle 12, a starter 13 and a light

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tube 14. As best seen in Figure 2, the tube receptacle 12 includes a recess 15 in which are provided a pair of resilient contacts 16 adapted to be engaged by pin contacts 17 formed at the end of the light tube 14. A slot 18 is provided in the receptacle which affords passage for the pins 17 when they are in vertically aligned position. After the pins have been introduced into the recess 15 the tube is rotated through 90°, thus bringing the pins 17 into engagement with the contacts 16.

Referring now to Figures 3 and 4, there is illustrated a simple and efficient mechanism for changing fluorescent light tubes. In these figures there is illustrated a staff or handle 30 which in the present embodiment is illustrated as of tubular construction. Rigidly secured in an open end of the handle 30 is a nut 31 which receives a threaded supporting member 32. At the free end of the supporting member 32 is a laterally extending arcuate arm 33 provided with a pivot 34 carrying a resilient tube gripping member 35. The tube gripping member 35 is preferably formed of resilient spring metal and is shaped to embrace slightly more than 180° of the tube 14. In addition, the interior of the arcuate member 35 is preferably lined with a friction producing material, such for example as felt.

The handle 30 adjacent its end is provided with an outwardly extending flange 38, and spaced therefrom is a washer 39 secured to the handle 30 as by welding or the like. Intermediate the flange 38 and the washer 39 is a sleeve 40 which is rotatable on the handle 30 but is restrained against longitudinal movement thereon by the flange 38 and the washer 39. Extending laterally from one side of the sleeve 40 is an arm 41. Interconnecting the sleeve 40 and the member 35 is a link 45 which is pivoted to the arm 41 as indicated at 46 and which is pivoted to the tube gripping member 35 as indicated at 47.

The operation of the light tube changer is believed apparent from the foregoing description but for clarity it will be reviewed. Assume that the problem is to insert a fluorescent light tube into receptacles 12. The light tube is pressed into position in the tube gripping member 35, as illustrated in Figure 3, and it is held therein by virtue of the resilient nature of the member 35 and is restrained against rotation therein as a result of the provision of the friction lining previously described. The handle 30 is now raised to introduce the pins 17 through the slots 18 into the recesses 15. It now remains to rotate the tube 14 through 90° in order to bring the pins 17 into contact with

the electrical contacts 16. Since the pins 17 are located within the recesses 15, rotation of the tube about a vertical axis is effectively prevented. The operator therefore merely rotates the staff or handle 30 in a direction to cause the threaded support 32 to move inwardly with respect to the tubular end portion of the handle. This has the effect of causing the axis of the pivot 34 to move downwardly with respect to the handle 30. However, at this time the link 45 restrains the pivot 47 to movement in an arc about the pivot 46. Accordingly, when the pivot axis 34 has been displaced downwardly with respect to the pivot axis 47 a sufficient distance the gripping member 35 will have been rotated in a counterclockwise direction, as seen in Figure 3, through an arc of 90°. At this time it is only necessary to disengage the gripping member 35 from the tube, which is easily done as a result of the resilient nature of the gripping member 35.

The illustrated embodiment is provided with the threaded connection between the nut 31 and the threaded support 32 because of the positive nature of the action resulting. It is appreciated, however, that other means for effecting movement of the support longitudinally of the handle could be provided, and the substitution of such other means is of course within the scope of the present invention.

Referring now to Figure 5, there is illustrated a tool for replacing fluorescent light tubes which incidentally is shown with means for replacing starters. In this case there is provided an elongated tubular handle 70 carrying a nut 71 at one end thereof. Adjacent the nut 71 the handle 70 is formed outwardly to provide a flange 72, and a washer 73 is provided adjacent the aforementioned end of the handle. Intermediate the flange 72 and the washer 73 is a sleeve 74 which is rotatably mounted on the handle but which is prevented from moving longitudinally thereof by the flange 72 and the washer 73.

In threaded engagement with the nut 71 is a threaded support 75 having a laterally extending arcuate arm 76. A resilient tube gripping member 77 is pivoted to the arm 76, as indicated at 78. The member 77 may be in all respects identical with the member 35 previously described. Extending laterally from the sleeve 74 is an arm 80. Interconnecting the arm 80 and the tube gripping member 77 is a link 81 which is pivoted to the member 77, as indicated at 82, and which is pivoted to the arm 80 as indicated at 83. This mechanism operates in the same manner as the mechanism previously described in connection with Figures 3 and 4. Extending longitudinally of the tubular handle 70 is a tubular member 85. The member 85 extends beyond the opposite end of the handle 70 and is formed to provide a plurality of starter gripping fingers 86 and 87, one of which preferably is provided with an inwardly projecting ledge 88 against which the bottom of the starter rests so as to positively prevent inward displacement of the starter during its insertion into its receptacle.

Means are provided for preventing or limiting rotation of the tubular member 85 with respect to the tubular handle 70 and these means may take the form of a spring 90 having an integral pin 91 thereon projecting through an opening in the tubular member 85 into an elongated slot 92 formed in the tubular handle 70.

In this case the tubular member 85 extends the full length of the handle 70 to a point closely adjacent to the inner end of the threaded support 75 and is connected thereto. The means for connecting the tubular member 85 to the inner end of the threaded support 75 should be such as to insure simultaneous movement of the parts longitudinally of the handle while at the same time permitting relative rotation therebetween. A convenient manner of effecting this connection is to provide a partial ball 95 on the inner end of the threaded support 75 and to form the adjacent end of the tubular member 85 around the ball as indicated at 96.

In this case inward movement of the tubular member 85 with respect to the handle, so as to bring the clamping fingers 86 and 87 into engagement with a starter, is effected from the opposite end of the handle by rotating the tube changer and its support 75 relative to the nut 71 so as to effect the appropriate longitudinal movement of the member 85 with respect to the handle. In the device illustrated the operation of the tube changer is identical with that of the tube changer illustrated in Figures 3 and 4. That is, the tube is inserted into its receptacles and thereafter the handle is rotated so as to effect longitudinal movement of the threaded support 75 relative to the handle, resulting in rotation of the tube supporting member 77 about its pivot axis 78. However, if preferred, it will be apparent that the connection between the tubular member 85 and the inner end of the threaded support 75 could be such as to prevent relative rotation between the parts, in which case actuation of the tube changer about its pivot axis 78 could be effected from the opposite end of the handle by gripping the outwardly extending portion of the tubular member 85 and rotating the handle 70. This has the result of preventing placing a strain on the pins of the light tube, although it has been found that such a construction is not ordinarily necessary.

The drawings and the foregoing specification constitute a description of the improved combination tube and starter changer and the specific tube changer and the specific starter changer in such full, clear, concise and exact terms as to enable any person skilled in the art to practice the invention, the scope of which is indicated by the appended claims.

What I claim as my invention is:

1. A device of the character described comprising an elongated handle, a support movable axially of said handle, a member for gripping a tube with its axis transverse to the axis of said handle pivoted to said support, and a link extending between said member and said handle to effect rotation of said member about its pivot axis upon relative movement axially of said handle between said handle and said support.

2. A device of the character described comprising an elongated handle, a support threaded to and movable axially of said handle, a member for gripping a tube with its axis transverse to the axis of said handle pivoted to said support, and a link extending between said member and said handle to effect rotation of said member about its pivot axis upon relative movement axially of said handle between said handle and said support.

3. A device of the character described comprising an elongated handle, a support threaded to and movable axially of said handle, a member for gripping a tube with its axis transverse to the axis of said handle pivoted to said support, a sleeve rotatably carried by said handle, means preventing movement of said sleeve along said

handle, and a link extending between said member and said sleeve to effect rotation of said member about its pivot axis upon relative movement axially of said handle between said handle and said support.

4. A device of the character described comprising a tubular handle, a nut rigidly secured to one end of said handle, a threaded element extending through said nut and beyond the end of said handle, an arm extending laterally from the outer end of said element, a spring clip shaped to engage a fluorescent light tube pivoted to said arm, a sleeve rotatably secured to said handle adjacent said one end, means preventing movement of said sleeve along said handle, and a link connecting said sleeve and said clips.

5. A device of the character described comprising a tubular handle, a nut rigidly secured to one end of said handle, a threaded element extending through said nut and beyond the end of said handle, an arm extending laterally from the outer end of said element, a spring clip shaped to engage a fluorescent light tube pivoted at one edge to said arm, a sleeve rotatably secured to said handle adjacent said one end, means preventing movement of said sleeve along said handle, and a link connecting said sleeve and a portion intermediate the edges of said clip.

6. A device of the character described comprising a tubular handle, a nut rigidly secured to one end of said handle, a threaded element extending through said nut and beyond the end of said handle, an arm extending laterally from the outer

end of said element, a trough shaped spring clip shaped to engage a fluorescent light tube pivoted at one edge of said arm, a sleeve rotatably secured to said handle adjacent said one end, means preventing movement of said sleeve along said handle, and a link connecting said sleeve and a portion intermediate the edges of said clip.

7. A device for inserting and removing elongated fluorescent light tubes from fixtures, which comprises a tube clamping element, means for pivotally supporting the tube clamping element at one side thereof, an actuator for said tube clamping element pivotally connected thereto at a point intermediate the sides thereof, and means for effecting relative longitudinal movement between said first mentioned means and said actuator, said last mentioned means including relatively rotatable engaging helical portions effective upon relative rotation to produce the relative longitudinal movement between said first mentioned means and said actuator.

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