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DEVICE FOR REMOVING AND INSTALLING TUBULAR LAMPS

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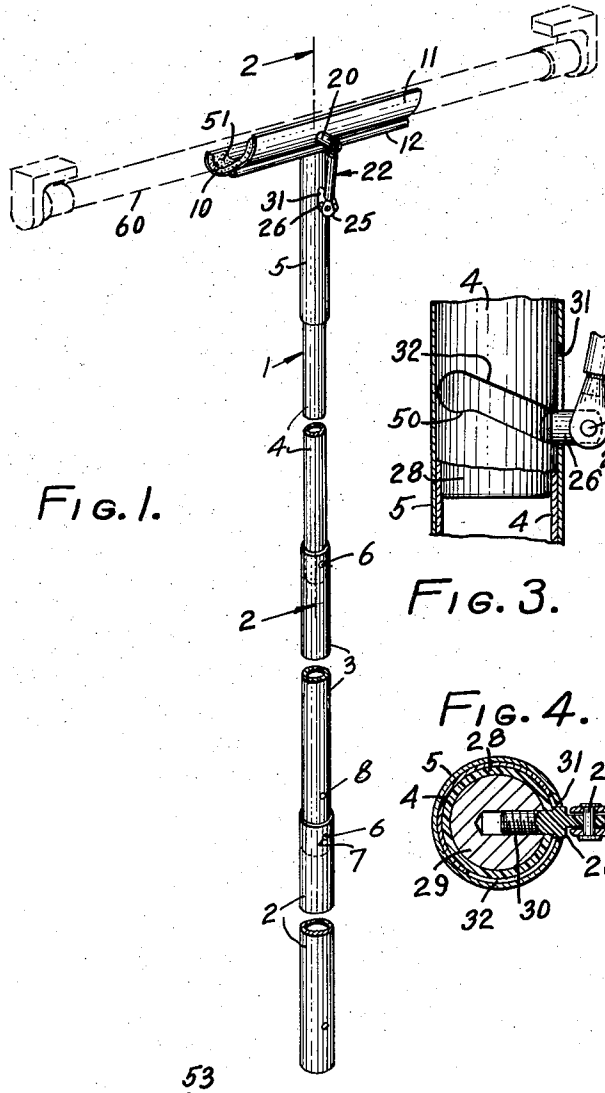


FIG. 1.

FIG. 3.

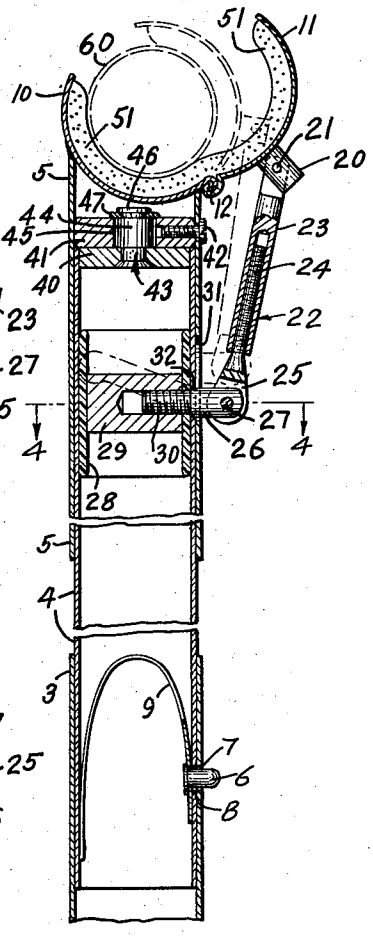


FIG. 2.

FIG. 4.

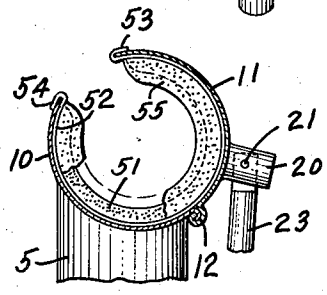


FIG. 5.

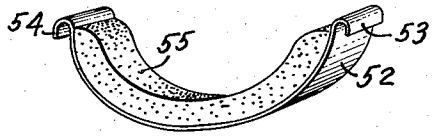


FIG. 6.

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DEVICE FOR REMOVING AND INSTALLING TUBULAR LAMPS

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The present invention relates to a device for the installation and removal of tubular lamps such as fluorescent lamps. As a rule, fluorescent lamps are provided with end electrodes or terminals such as the single pin type adapted to be received in an end receptacle or socket member.

The present device of the invention is so constructed and arranged as to permit a workman to remove or install a tubular lamp which may be situated in a ceiling, in a fixture over a display counter, or other location without necessitating the use of a ladder. Tubular lamps positioned over a display counter at any height ordinarily offer difficulty to a workman, but with the present device of the invention a workman may remove the lamp easily and safely.

Most devices for the removal or installation of tubular lamps are of complicated construction, utilize hand levers, springs and linkages of various types for operating a jaw of a pair of jaws whereas our invention incorporates a construction which does not utilize hand levers or springs, is of few parts, foolproof in operation, generally superior as to maintainance and cost of manufacture to devices of the character stated now known to the inventors.

Most devices for installing and removing tubular lamps incorporate a fixed and movable jaw, which jaws are adapted to be actuated to grip the tubular lamp or to release the same. With our invention, we utilize a tubular pole formed in sections which telescope to the end that the device when fully telescoped will occupy a small space, or when extended may reach considerable height. The tubular pole is adapted to be axially rotated relative to the jaws, the rotation actuating a movable jaw relative to a fixed jaw so as to embrace a tubular lamp, or to release the same. Such action is positive and assures a firm grip on the tubular lamp. The tubular lamp may be released by reversing the direction of rotation of the pole.

Preferably we form our invention from light stock so that the device may be easily handled without undue fatigue on the part of the workman.

The above mentioned and other objects in view, the invention consists of the novel and useful provision, formation, construction, association and relative arrangement of parts, members and features, all as shown in one embodiment in the accompanying drawing, described generally, and more particularly pointed out in the claims.

In the drawing:

FIGURE 1 is a perspective view, partly in section, and showing the device of the invention as an entirety engaging a tubular lamp;

FIGURE 2 is a fragmentary, sectional view taken on the line 2—2 of FIGURE 1, and on an enlarged scale;

FIGURE 3 is a fragmentary sectional view of a portion of the tubular pole showing a cam construction for operating an adjustable link joining the movable jaw;

FIGURE 4 is a fragmentary sectional view on the line 4—4 of FIGURE 2;

FIGURE 5 is a fragmentary, partially sectional view showing the movable jaw closed to the fixed jaw; and,

FIGURE 6 is a perspective view of a sponge rubber insert which may be incorporated between the fixed and movable jaws of the invention.

Referring to the drawing, a tubular pole designated as an entirety by 1, is made up of a plurality of telescopic

sections 2, 3, 4, and 5. The sections are of selected length to the end that the pole may be extended to the length desired and the telescopic sections may be locked together in an extended position. Thus in FIGURE 2 the sections 3 and 4 are shown locked together by means of a lock pin 6 passed through bores 7 and 8 of the sections, the lock pin being spring pressed by means of a U-shaped leaf spring 9 within the section 4. Obviously the sections 3 and 4 may be released for telescopic movement by pushing inwardly upon the pin 6 to release the same from the bore 7. This type of a release may be used for additional sections, such as between the lower end of the section 3 and the bottom tubular section 2. The arrangement is such that all of the sections may be telescoped one within the other, resulting in a short length pole.

The fixed top section 5 and the tubular section 4 do not have relative telescopic movement, and the section 4 may be rotated within section 5. The top section 5 has secured thereto jaw 10, termed the fixed jaw. Jaw 10 is transverse the tube 5 and secured to the tube in any appropriate manner, such as by welding. The axis of the jaw 10 and the axis of the tube 5 are in right angular or normal relationship, the tube 5 being positioned intermediate the longitudinal length of the jaw 10. An arcuate movable jaw 11 is hinged to the fixed jaw at 12 and while the hinge may take any form desired, in the present instance one longitudinal edge of each jaw is of folded ring seam construction. The ring seams interengage to form the hinge. Both jaws are of equal length and do not completely close as shown in FIGURE 5, but close sufficiently to embrace a tubular lamp, the movable jaw opening or swinging relative to the fixed jaw a sufficient degree to free the tubular lamp as shown in FIGURE 2. In this regard, it will be noted from FIGURE 2 that the fixed jaw is so cradled on the end of the section 5 of the tubular pole that the hinge 12 lies externally of section 5. Hence all swinging movement of the movable jaw 11 is away from the section 5, or inwardly when the jaw is closed. When the jaws are closed, the contiguous jaw edges are substantially 15° apart and when opened, as shown in FIGURE 2, are substantially 75° apart. This spacing, of course may vary.

To cause relative opening and closing of the jaws, the jaw 11 is provided with a split stud 20 substantially positioned intermediate the length of the jaw and radially extending from the outer surface of jaw 11. The split stud has pivotally joined thereto at 21, an adjustable link 22 comprising a threaded socket member 23 and a bolt 24. The socket member has a flat sided extremity which fits within the split portion of stud 20 and the bolt has a screw threaded shank which engages the threads of the socket member. The bolt has a head 25 having flattened sides, the head fitting within the fork of a forked end screw coupling 26. The bolt and the screw coupling are pivoted together by means of a pin 27. Within tube 4 is a short length tube 28 which may be formed from a material such as a fiber, rubber, plastic or other composition. Fitted within tube 28, substantially intermediate the ends of said tube, is a block 29. This block is provided with a radial screw threaded bore 30. The screw coupling 26 is adapted to be passed through a longitudinal slot 31 in tube section 5 and through an inclined cam slot 32 in section 4 which is in registry with bore 30. The threaded end of the screw coupling is completely enclosed within the threaded bore of block 29 and within the tube 28 while the unthreaded portion thereof extends through the cam slot 32 and the slot 31.

Tube 4 has internally secured therein a bearing block 40 and tube section 5 is provided with a bearing block 41, bearing block 41 being secured against rotation within the tube section 5 by means of a screw 42 radially passed through tube section 5 and into a radial threaded bore in

block 41. To secure the two blocks 40 and 41 together for rotation, we have provided a thrust bearing designated generally as 43. The thrust bearing comprises a pin 44 extending centrally through the block 40 and through an enlarged bore 45 in block 41. The pin is headed or flanged at its upper end 46 and a snap ring 47 engages the block 41 and the head 46 for holding the parts in assemblage.

We have provided inserts secured as shown in the several figures to the jaws 10 and 11. Preferably the inserts comprise elongated strips of sponge rubber 51 positioned adjacent ends of the jaws. These strips may be cemented to the inner surfaces of both jaws.

The sponge rubber inserts are so dimensioned as to thickness as to accommodate so-called standard or large tubular lamps. Standard tubular lamps have various diameters from one and three-quarters inches to two inches, while the larger tubular lamps may range above the two inch diameter. Small tubular lamps are provided at times, which may have a diameter of one and one-eighth inches and when the tubular lamps are of small diameter, we propose to use inserts of the type shown in FIGURE 6, in the manner shown in FIGURE 5. In FIGURE 6 we have provided a spring metal strip 52 having returnedly bent end portions 53 and 54 and on the inner surface of the metal strip, a sponge rubber strip 55 is provided. The sponge rubber strip 55 has greater thickness than the fixed rubber strip 51. The returnedly bent ends 53 and 54 are adapted to embrace the fixed and movable jaws and to be positioned adjacent the fixed rubber strips 51 at ends of the jaws, as shown in FIGURE 5.

It will be noted that the cam slot 32 has a flat portion at its upper end 50 which functions as a snap lock for the screw coupling when the screw coupling has reached this portion, all as will appear in the statement of operation.

The operation, uses and advantages of our invention are as follows.

Assuming that the pole and the several sections thereof are in extended relationship, as shown in FIGURE 1, the pins 6 being passed through the bores 7 and 8 of the several sections, the operator by grasping section 5 may simultaneously rotate the remaining sections which are interlocked to open the jaws in the position shown in FIGURES 1 and 2. Having accomplished this function, the operator then extends the pole upwardly to the position where the jaws receive therebetween tubular lamp 60. The operator rotates the tubular pole, it being observed that the jaws through their engagement with the tubular lamp, will not tend to rotate as the pole is rotated, with the result that closing movement of jaw 10 occurs for the reason that tubes 2, 3, and 4, and particularly tube 4, rotates within tube 5 and such rotation produces travel of the screw coupling 26 within the cam slot 32 and the longitudinal slot 31. This moves jaw 11 towards jaw 10 and the sponge rubber inserts 51 or 55, depending on tube diameter, then embrace the tubular lamp, as shown in the dotted line position for jaw 11 in FIGURE 2. The screw coupling will have snap lock engagement with the flat portion 50 of the cam slot when the jaws are closed. The arrangement is such that counter clockwise rotation of the pole closes the jaws while clockwise rotation opens the same. Hence the jaws will not release the tubular lamp during a removal or replacement operation thereof as gravity tends to turn the tubular lamp counter clockwise when the jaws engage the lamp beyond center and near one end thereof. A new tubular lamp may be placed between the jaws, the jaws locked closed and the lamp

replaced. The tubular pole may have its sections readily collapsed by pushing inwardly on the pins 6 between the several sections to permit the sections to telescope, the section 3 telescoping as far as section 5 but not overlapping the section as the ends of said sections are brought into juxtaposition. The tubular pole may be very compact as to length when the sections thereof are telescoped. It is important to note that the adjustable link 22 regulates the opening and closing position of the movable jaw and that a mere axial turning of the tubular pole by the operator opens and closes jaw 11. The thrust bearing 43 has limited lateral adjustment between the blocks 40 and 41 due to the enlarged bore 45 in block 41. Thus, any off-center relationship between block centers will not effect rotation between the parts. Thus, the use of springs, handles that must be manipulated, and generally a two-handed operation is done away with by our construction. There are few parts to the device, and substantially no parts subject to faulty operation. The tubular pole may be formed of various materials such as magnesium, aluminum, or plastic, to name but a few, the main principal being to provide a telescopic tubular pole of light weight and strength so that the operator will not be fatigued in its use even though the tubular pole must be extended to great length.

We claim:

1. A device for removing and installing tubular lamps, including: a tubular pole formed in sections, a fixed jaw and a movable jaw hinged together, the fixed jaw transversely secured to one end of one tubular section, means rotatively securing a second tubular section to the first tubular section, the second tubular section provided with a cam slot and the first tubular section provided with a longitudinal slot and linkage means between the movable jaw and passed through the cam slot and the longitudinal slot whereby when one tubular section is rotated relative to the other tubular section, the linkage means opens and closes the movable jaw.

2. A device for removing and installing tubular lamps, including: an inner and an outer tubular section, a pair of elongated jaws transversely positioned on one end of the outer tubular section, means securing the outer and the inner tubular sections together for axial rotation, said inner tubular section provided with a cam slot extending in part circumferentially of said section, and said outer tubular section provided with a longitudinal slot adapted to register with said cam slot, a link, means securing one end of said link to said movable jaw and means passed through the longitudinal slot and the cam slot, secured to the opposite end of said link and whereby rotation of the inner tubular section causes movement of the link to open and close the movable jaw.

3. The device as set forth in claim 2, a block secured within the inner tubular section and the means passed through the longitudinal and cam slots being secured to said block.

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