April 20, 1948. W. G. DARLEY 2,439,885

LUMINAIRE

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FIG. 1

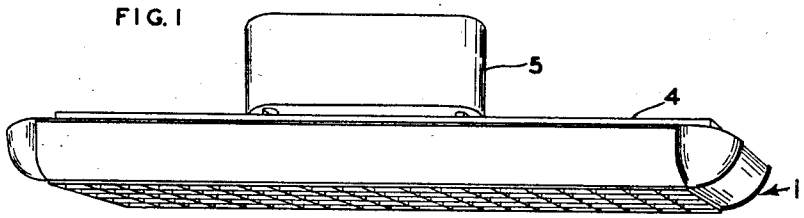


FIG. 3

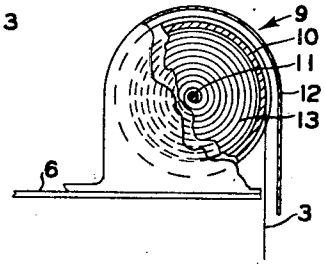
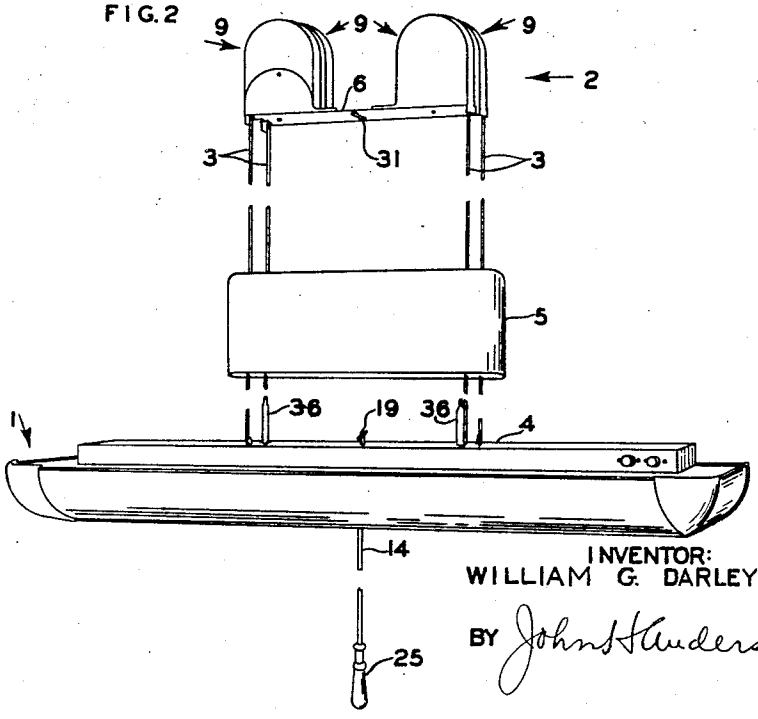


FIG. 2



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FIG. 7

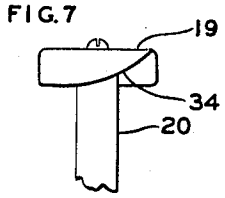


FIG. 5

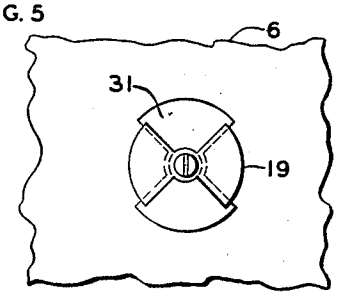


FIG. 4

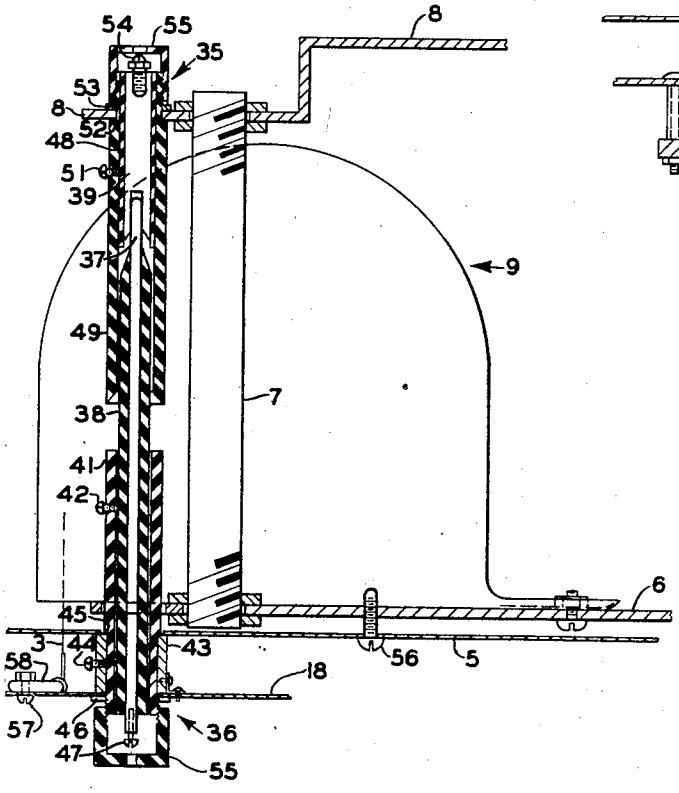
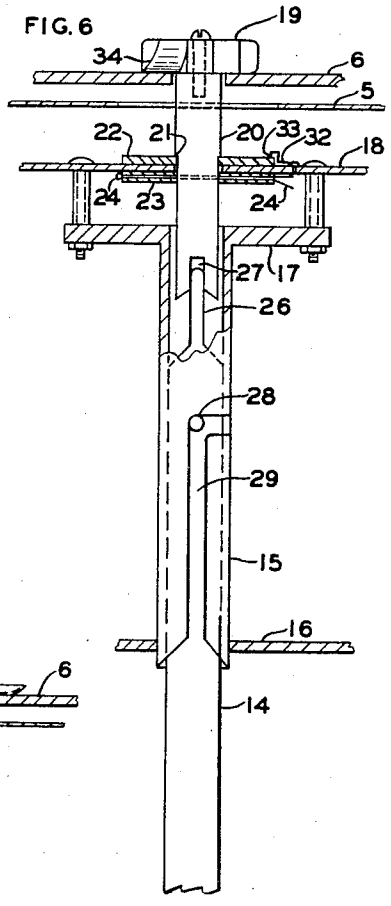


FIG. 6



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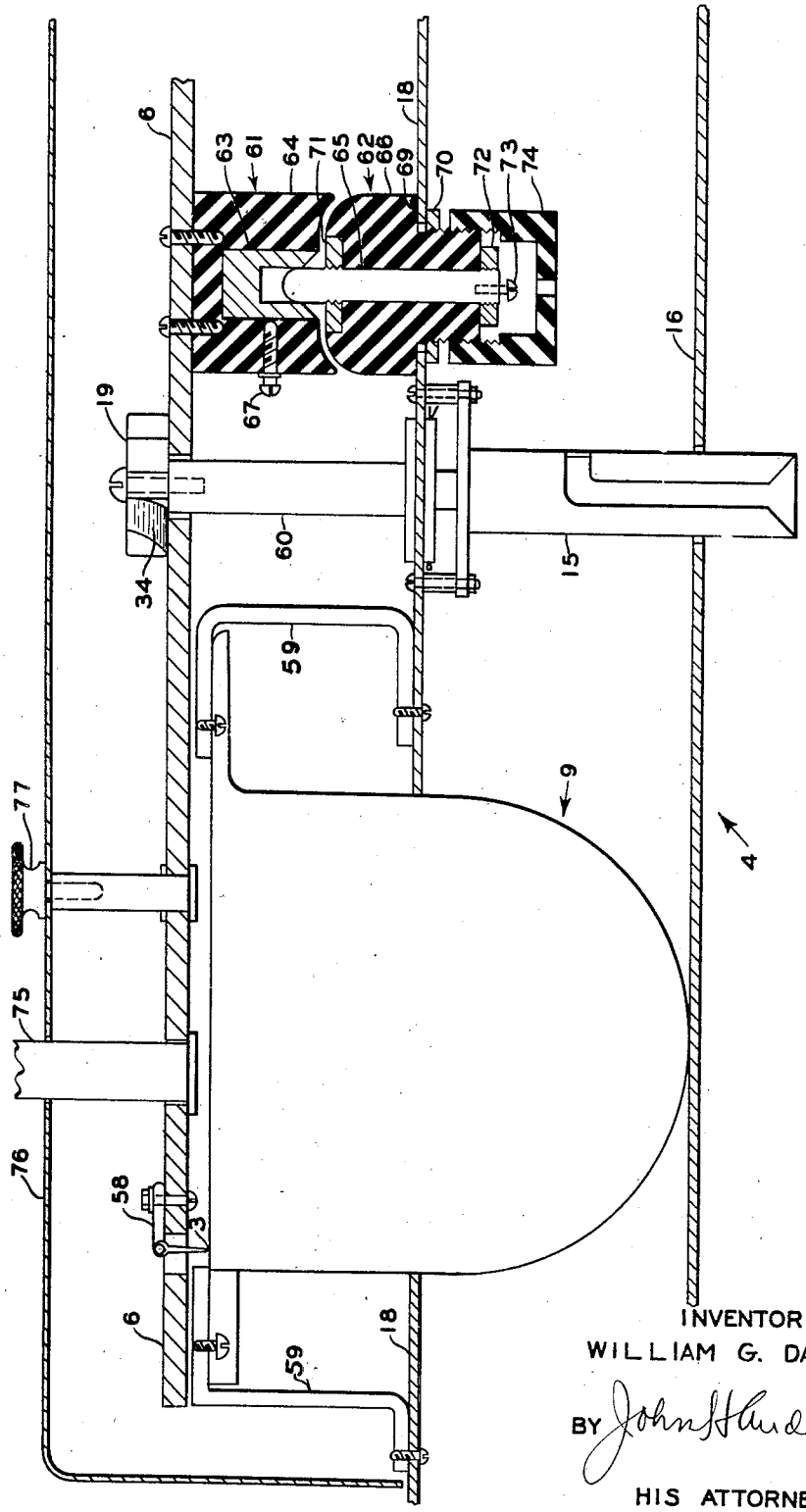


FIG. 8

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UNITED STATES PATENT OFFICE

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LUMINAIRE

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Application April 27, 1945, Serial No. 590,617

4 Claims. (Cl. 248—319)

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My invention relates to lighting equipment or luminaires and is of particular interest in connection with such equipment accommodating elongated fluorescent lamps and mounted at substantial heights above the floor.

Maintenance of such equipment, that is, changing the lamps and cleaning the equipment is frequently neglected because of the inconvenience involved in first obtaining and then climbing up a ladder to reach the equipment. The principal object of my invention is to provide a luminaire which may be mounted at substantial heights and yet be serviced from the floor of a room. Another object of my invention is to provide such a luminaire which may be easily installed. Further objects and advantages of my invention will appear from the following detailed description of species thereof and from the appended claims.

In the drawing accompanying and forming part of this specification an embodiment of my invention is shown in which: Fig. 1 is a perspective view of a species of my new lighting equipment as seen from below; Fig. 2 is a similar view of the luminaire in position for servicing with the support covering canopy lowered to show the support; Fig. 3 is a side elevational, enlarged, partly sectional view of one of the spring balances of my equipment; Fig. 4 is an enlarged, fragmentary, side elevational, partly sectional view of one end of the supporting means and one pair of electrical contacts of my equipment; Fig. 5 is an enlarged, top plan view of a catch for releasably locking parts of my equipment together; Fig. 6 is an enlarged, fragmentary, side elevational, partly sectional view of the means for moving the fixture vertically and for locking it with the support; Fig. 7 is a side elevational view of the catch shown in Fig. 5 rotated 90 degrees from its position in Fig. 5; and Fig. 8 is an enlarged, fragmentary, side elevational, partly sectional view of one end of another species of my invention.

As shown in Figs. 1 to 4 of the drawing the lighting equipment or luminaire comprises a lighting fixture 1 and a ceiling mounted, enclosed support 2 for the fixture 1 which is attached to the support by a number of tapes 3 (Fig. 2). The fixture 1 is of a conventional type and comprises an elongated support housing or channel 4 enclosing the wiring and ballast equipment for fluorescent lamps supported in a horizontal plane and parallel to and on both sides of the channel by sockets secured to the channel 4. The lamps are shielded from view by curved,

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light diffusing side and end panels and by louvers mounted beneath the lamps. Such fixtures are well known and further description thereof is not necessary for a complete understanding of my invention. The lamps may be readily removed and the interior of the fixture cleaned from the top of the fixture without disturbing the shielding medium when it is lowered from its usual position adjacent the ceiling (Fig. 1) to the position in which it may be serviced near the floor (Fig. 2).

The support 2 for the fixture is shown enclosed by a canopy 5 in Fig. 1 and in detail in Figs. 2 to 4 of the drawing and comprises a support or mounting plate 6 attached at each end by a bolt 7 (Fig. 4) to a conventional spreader 8 which may be secured to the usual ceiling outlet box in the usual manner. The plate 6 has four counter-balances 9 attached thereto, one at each of its corners, and the tapes 3 of the balances 9 are attached to the channel 4 of the fixture 1 at four spaced points (Fig. 2). As shown in Fig. 3 each of the counter-balances 9 comprises a hollow drum 10 mounted for rotation on a fixed shaft 11 secured to a housing 12 which is bolted to the support plate 6. A volute spring 13 having its inner end secured to the fixed shaft 10 and its outer end secured to the inner surface of the drum 10 is provided to exert torque on the drum. The torque exerted by the springs 13 in the four balances 9 is sufficient to balance the weight of the fixture 1 in any position of the fixture 1. Thus, the fixture 1 may be easily moved in a vertical direction and will remain at rest in any selected position between the plate 6 and that determined by the length of the tapes 3.

I have provided means for readily moving the fixture 1 vertically and for positively locking it with the plate 6 while the person doing the work stands on the floor. The means is shown in Figs. 2, 5 and 6 of the drawing and comprises a key 14 in the form of a rod of a length suitable for conveniently reaching the fixture 1 from the floor and a lock having a flared, tubular guide 15 (Fig. 6) which accommodates the end of the rod 14, passes through the lower wall 16 of the channel 4 and has its flared end 17 spaced from and bolted to the upper channel wall 18.

The lock also comprises a rotatable catch 19 of the butterfly type having a shouldered stem 20 passing through the upper wall 18 of the channel and extending into the guide tube 15 for engagement with the end of the rod 14. The shoul-

der 21 of the stem 20 rests against a washer 22 on the outside of the upper wall 18 of the channel 4. Another washer 23 provided with a cotter pin 24 extending through a transverse opening in the stem 20 is located so as to engage the inside of the said channel wall 18. The catch 19 thus is rotatable but is not movable longitudinally.

The rod 14 has a hand-grip 25 at one end and its opposite end 26 is spade shaped to engage with a slot 27 in the stem 20 of the catch 19. The rod 14 also has a transversely projecting indexing pin 28, adjacent its spade-shaped end 26 which slides along a longitudinally extending, indexing slot 29 in the guide 15 as the end 26 of the rod 14 is moved into the guide 15. The indexing slot 29 extends a sufficient distance longitudinally of the guide 15 to permit the spade end 26 of the rod 14 to enter the stem slot 27. The indexing slot 29 then turns at right angles and extends horizontally through an angular distance of approximately 90° so that the rod 14 and therewith the catch 19 may be rotated through a similar angular distance to move the catch 19 from its locked position with plate 6, shown in Fig. 5, to its unlocked position in which it may pass through the butterfly shaped opening 31 in plate 6. When the catch 19 is in its unlocked position the pin 28 is within the horizontal portion of the indexing slot 29. The fixture 1 may then be lowered for servicing by exerting a downward force on the rod 14. After the fixture 1 has been serviced it may be returned to its raised position by pushing the rod 14 upward and then, when the fixture 1 has reached its limit of travel upward, rotating the rod 90° to return the catch 19 to its locked position, and the pin 28 on the rod 14 to a position to follow the vertical portion of the indexing slot 29. The end 26 of the rod 14 may then be withdrawn from the guide 15.

The butterfly catch 19 is releasably held against rotation in either its engaging or disengaging positions with plate 6 by a spring clip 32 secured to the channel wall 18 and engaging a pair of suitably spaced notches 33 in the peripheral portion of washer 22 which is keyed to stem 20 of catch 19 so as to rotate therewith. The catch 19 is of substantial depth or thickness and the lower surfaces 34 thereof have a helicoidal portion to pull the fixture 1 up against the other parts of the luminaire as the catch 19 is rotated to engage plate 6. The surfaces 34 also have a horizontal planar portion which engages plate 6 when the catch 19 is in its locking position.

The fixture 1 is supplied with electrical energy for the lamps through a pair of female contacts 35 (only one of which is shown) mounted adjacent opposite ends of the spreader 8 (Fig. 4) and which may be connected by wires to the usual ceiling outlet box. Each female contact 35 is engaged, when the fixture 1 is raised completely, by a male contact 36 mounted on the upper wall 13 of the fixture channel between the catch 19 and the tapes 3 (Fig. 2) and connected to the lamp ballasts in the channel 4. The contacts 35 and 36 are disengaged and the fixture thus disconnected from the power source when the fixture is lowered even a small distance from the support plate 6 so that it may be safely worked on in its lowered position.

Each male contact 36 comprises a metal contact rod 37 one end of which projects beyond a split tube 38 of electrical insulating material, such as fibre tube, for engagement with the

slotted electrical conducting part 39 of the female contact 35. The contact rod 37 and tube 38 are held in a holding tube 41 by a set screw 42. The holding tube 41 passes through a bushing 43 bolted to the top wall 18 of the fixture and is held therein by a set screw 44. In the drawing I have shown also the holding tube 41 provided with a shoulder 45 resting against the top of the bushing 43 and a nut 46 engaging the threaded end of the holding tube inside the channel to clamp the holding tube 41 to the bushing 43. The lower end of the contact rod 37 is provided with a conventional screw 47 for clamping a current lead wire connected to the lamp ballast against the rod 37.

The female contact comprises, in addition to the slotted part 39, a split tube 48 of electrical insulating material, such as a fiber tube. The slotted part 39 and the split fiber tube 48 are held in a supporting tube 49 by a set screw 51. The supporting tube 49 has a shoulder 52 held against the spreader 8 by a nut 53 engaging with the threaded end of the support tube 49 which projects through the spreader 8. The end of the slotted contact part 39 is provided with a screw 54 for clamping thereagainst a current leadwire from the power source. A screw cap 55 of electrically insulating material engages the threaded end of the holding tube 49 and gives protection against accidental contacts with exposed portions of the conducting parts of the female contact 35. A similar cap 55 is provided to protect against accidental contacts with the end of the contact rod 37 within the channel 4.

As is plainly shown in the drawing the parts of the contacts 35 and 36 are so arranged that the contact rod 37 is withdrawn from the slotted part 39 before its exposed end reaches the end of the holding tube 49 as the fixture is pulled downward. The slotted part 39 terminates well within the holding tube 49 which is too small in diameter to permit the insertion of a person's finger. The portion of the contacts 35 and 36 which overlap each other when the catch 19 is locked with plate 6 do not overlap sufficiently to engage each other when the catch 19 is below plate 6. Thus, if the catch 19 is rotated inadvertently so that it rests against the bottom of plate 6 the contacts 35 and 36 do not engage each other and the lamps will not light. The failure of the lamps to light will cause the operator to investigate and thus discover his mistake.

The canopy 5 is secured to the supporting plate by bolts 56, one of which is shown in Fig. 4 of the drawing. The canopy 5 has openings through which extend the supporting tapes 3 and through which may pass the male contacts 36 and the catch 19. The tapes 3 are fastened to the channel 4 by easily releasable bolts 57 engaging with eyes 58 attached to the tapes.

The equipment is easily installed as follows: The spreader 8, to which is attached the female contacts 35, the supporting plate 6 and its balances 9, is fastened in the usual manner to the ceiling fixture stud. The wires from the outlet box are connected to the female contacts 35 and the canopy 5 is bolted to the support plate 6 to conceal the supporting and electrically conducting parts. The tapes 3 are then pulled down one at a time and bolted to the fixture channel 4. The fixture is then raised to its at rest position against the canopy 5 and the butterfly catch 19 is turned to its locked position by the key 14.

The key 14 is withdrawn from the fixture which is then ready for use.

When the luminaire described above is one of a number of luminaires illuminating a room and connected in parallel in a circuit controlled by a single wall switch it is not necessary, as heretofore, to open-circuit the switch and put out all the lamps in the luminaires when work of a nature making desirable an electrically uncharged fixture is to be done on one of the fixtures. The fixture to be worked on is automatically disconnected from the circuit by pulling it down to the level where the work is to be done. The other luminaires thus may be left operating to illuminate the room while work is being done on the lowered fixture.

The lighting equipment shown in Fig. 8 of the drawing is similar to that shown in Figs. 1 to 6 except that the counter-balances 9 are inverted from the position shown in Figs 1 to 6 and are mounted in the support channel 4' of the fixture 1 with the ends of tapes 3 attached to the support plate 6. This has the advantage of reducing the depth of the canopy and the luminaire to a minimum.

As shown, the balances 9 are fastened to the top wall 18 of the fixture 1 by metal straps 59 which rest against the support plate 6 when the fixture 1 is completely raised. The tapes 3 pass through openings in the support plate 6 and the eyes 58 are bolted to said plate. A catch 19 similar to that described in connection with the embodiment shown in Figs. 1 to 6 is mounted on the top wall 18 of the channel 4 and engages with the support plate 6. The stem 60 of the catch is longer than that of the catch of the other embodiment due to the greater separation between the top wall 18 of the channel and the plate 6 but is otherwise of the same construction. The electrical contacts 61 and 62 for connecting the lamp ballast (not shown) in channel 4 to the power source are of shorter length than those of the embodiment of Figs. 1 to 6 and the female contact 61 is bolted to the support plate 6 instead of a spreader. The female contact 61 comprises a metal part 63 having a cavity for accommodating the contact rod 65 of the male contact 62, an electrically insulating support 64 for the metal part 63 and a contact screw 67 passing through the insulating part 64 and engaging the metal part 63. The insulating part 66 of the male contact 62 has a shoulder 69 which rests against the outer surface of the top wall 18 of the channel and its screw threaded end which passes through an opening in the top wall is engaged by a nut 70 which holds the contact 62 on the channel. The metal rod 65 of the contact 62 is secured to the insulating part 68 by a pair of nuts 71 and 72 engaging the screw threaded portions of the rod 65 which also has a screw 73 for engaging the ballast equipment lead wire. An insulating cap 74 covers the exposed end of the metal rod 65. Another pair of contacts is similarly mounted on plate 6 and the wall 18 alongside of contacts 61 and 62 so that the two pairs of contacts are in a line transverse to the channel 4.

The plate 6 is supported by stems 75 which are attached to a spreader (not shown) which is of the same type and attached to the ceiling stud in the same manner as the spreader 8 of the embodiment of Figs. 1 to 7. The spreader is concealed by a conventional ceiling canopy (not shown). The stems 75 may be elongated when the room has a high ceiling so that support plate

6 and the fixture, when raised, may be located at preferred distances above the working surface. A cover 76 for the support plate opens downwardly and is attached to the support plate by studs and knurled nuts 77. The open mouth of the cover 76 is separated only slightly from the fixture and is concealed thereby when the fixture is raised completely.

The fixture is raised and lowered by the same means and in the same manner and the various parts of the luminaire cooperate in the same way as in the embodiment of Figs. 1 to 6.

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

1. A luminaire comprising in combination, a mounting plate attachable to a ceiling member, a lamp accommodating fixture mounted beneath said plate, extensible counterbalancing means connecting said plate and said fixture for supporting the latter in a raised position suitable for illumination and in a lowered position suitable for servicing, and separable contacts for connecting said fixture to an electric power source in its raised position and for disconnecting said fixture from the power source when the fixture is moved from its raised position, and a catch releasable from below said fixture, mounted on said fixture and engageable with said mounting plate for locking said fixture in its raised position, said catch being rotatable and having surfaces partly helicoidal and partly planar in shape to draw up and retain the fixture in its raised position and having also a vertically disposed stem, and a tubular guide mounted in alignment with and below said stem to guide a key into engagement with the stem, said guide having an indexing slot extending first vertically and then horizontally for engaging said key as it is moved upward and then rotated to first engage and then move the catch from its locked to its unlocked position whereby the fixture may be lowered by moving the key downwardly.

2. A luminaire comprising in combination, a mounting plate attachable to a ceiling member, a fluorescent lamp accommodating fixture mounted beneath said plate, extensible counterbalancing means connecting said plate and said fixture for supporting the latter in a raised position suitable for illumination and in a lowered position suitable for servicing, and separable contacts for connecting said fixture to an electric power source in its raised position and for disconnecting said fixture from the power source when the fixture is moved from its raised position, and a key actuated lock secured to said fixture and comprising a rotatable mounting-plate-engaging catch having a vertically disposed stem, and a tubular guide fixedly mounted in alignment with and below the stem to guide a key having an indexing pin upward into an engagement with the stem, said guide having an indexing slot the sides of which are vertical in part and horizontal in part and engage the indexing pin as the key is moved upward along the guide into engagement with the stem and then rotated in the guide to move the catch from its locked to its unlocked position whereby the fixture may be lowered by moving the key downwardly.

3. A key actuated lock for releasably engaging a lighting fixture with a support beneath which said fixture is mounted for vertical movement, said lock being mountable on said fixture and comprising a fixture support engaging, rotatable catch having a vertically disposed stem, and a tubular guide fixedly mounted in alignment with

and below the stem to guide a key having an indexing pin upward into an engagement with the stem, said guide having an indexing slot the sides of which are vertical in part and horizontal in part and engage the indexing pin as the key is moved upward along the guide into engagement with the stem and then rotated in the guide to move the catch from its locked to its unlocked position whereby the fixture may be lowered by moving the key downwardly.

4. A key actuated lock for releasably engaging a lighting fixture with a support beneath which said fixture is mounted for vertical movement, said lock being mountable on said fixture and comprising a rotatable catch having surfaces partly helicoidal and partly planar in shape to engage, draw up and retain the fixture against said support and having also a vertically disposed stem, said lock also comprising a tubular guide fixedly mounted in alignment with and below the stem to guide a key having an indexing pin upward into an engagement with the stem, said guide having an indexing slot the sides of which are vertical in part and horizontal in part and

engage the indexing pin as the key is moved upward along the guide into engagement with the stem and then rotated in the guide to move the catch from its locked to its unlocked position whereby the fixture may be lowered by moving the key downwardly.

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