United States Patent [19]

Wolf

[11] **3,805,054**

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[54] **GROUND LEVEL SERVICE RACK FOR POLE-MOUNTED FIXTURES**

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[52] **U.S. Cl.** **240/70,** 240/64, 240/84, 248/320

[51] **Int. Cl.** **F21v 21/38**

[58] **Field of Search** 240/63, 64, 67, 70, 84; 248/320, 408

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Primary Examiner—Fred L. Braun
Assistant Examiner—E. M. Bero
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[57] **ABSTRACT**

An assembly for ground level installation and servicing of one or more pole-mounted light sources includes a support rack having guide sheaves which ride the pole in response to operation of a hoist cable and pulley arrangement. To slow the fall of the rack in the event of hoist cable failure during raising or lowering, the guide sheaves are urged against the pole by springs which remain in compression independently of hoist cable tension. The rack is latched at the pole top independently of the hoist cable and is releasable at ground level by actuation of a latch line. Light sources are mounted on the rack at a higher elevation than the guide sheaves to cause the sheaves, rather than the sources, to absorb substantially all impact if the rack falls.

9 Claims, 8 Drawing Figures

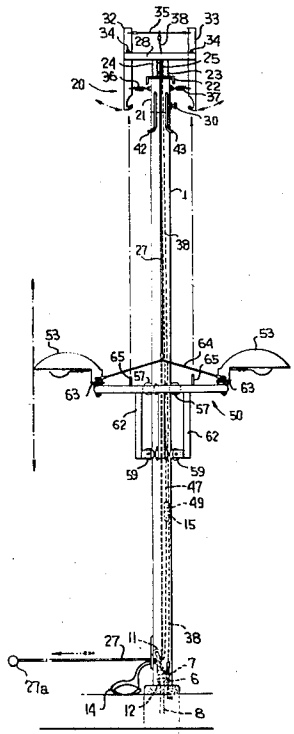


FIG.1

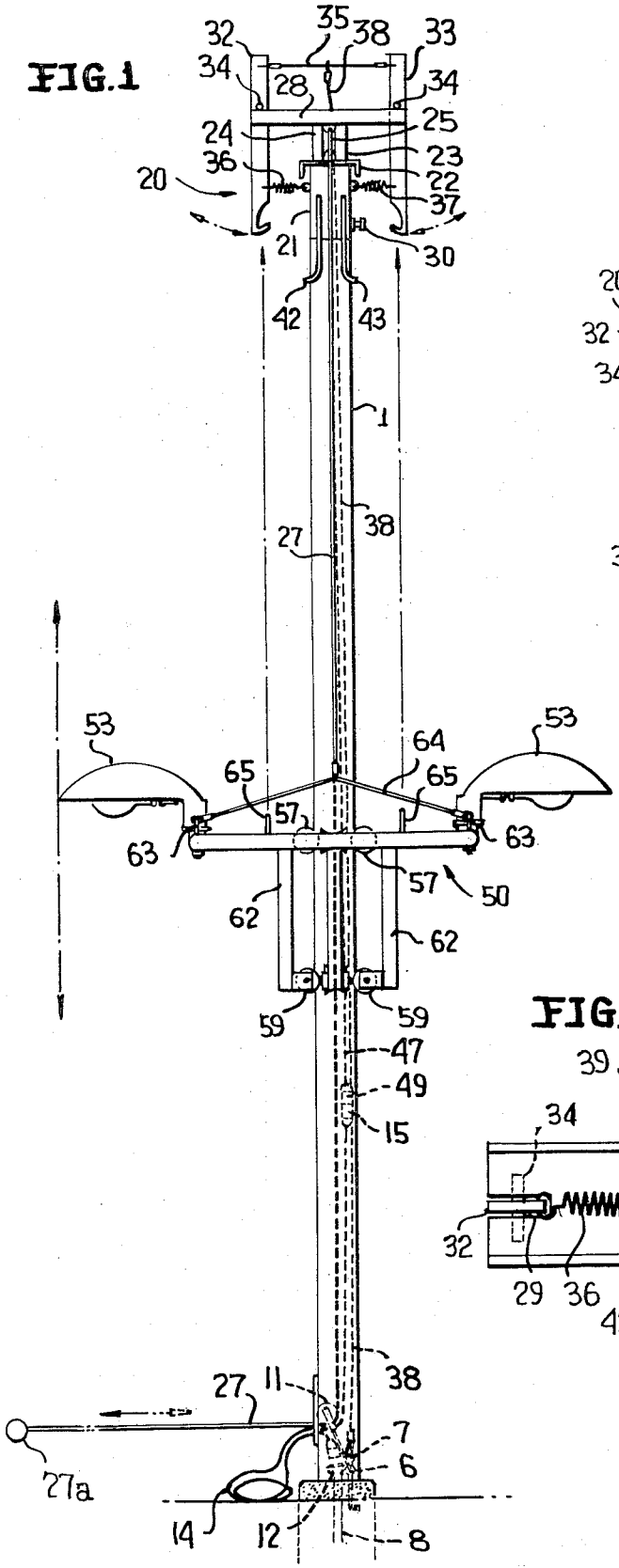


FIG.2

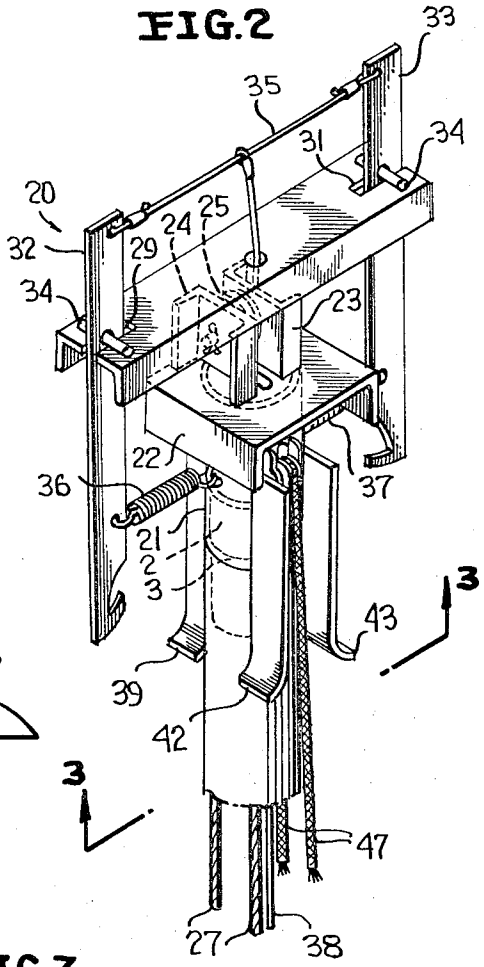
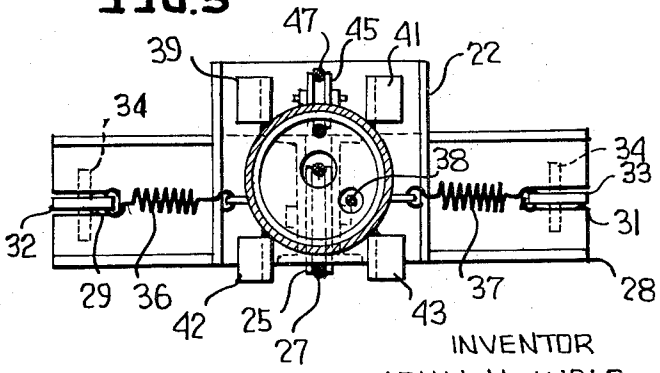


FIG.3



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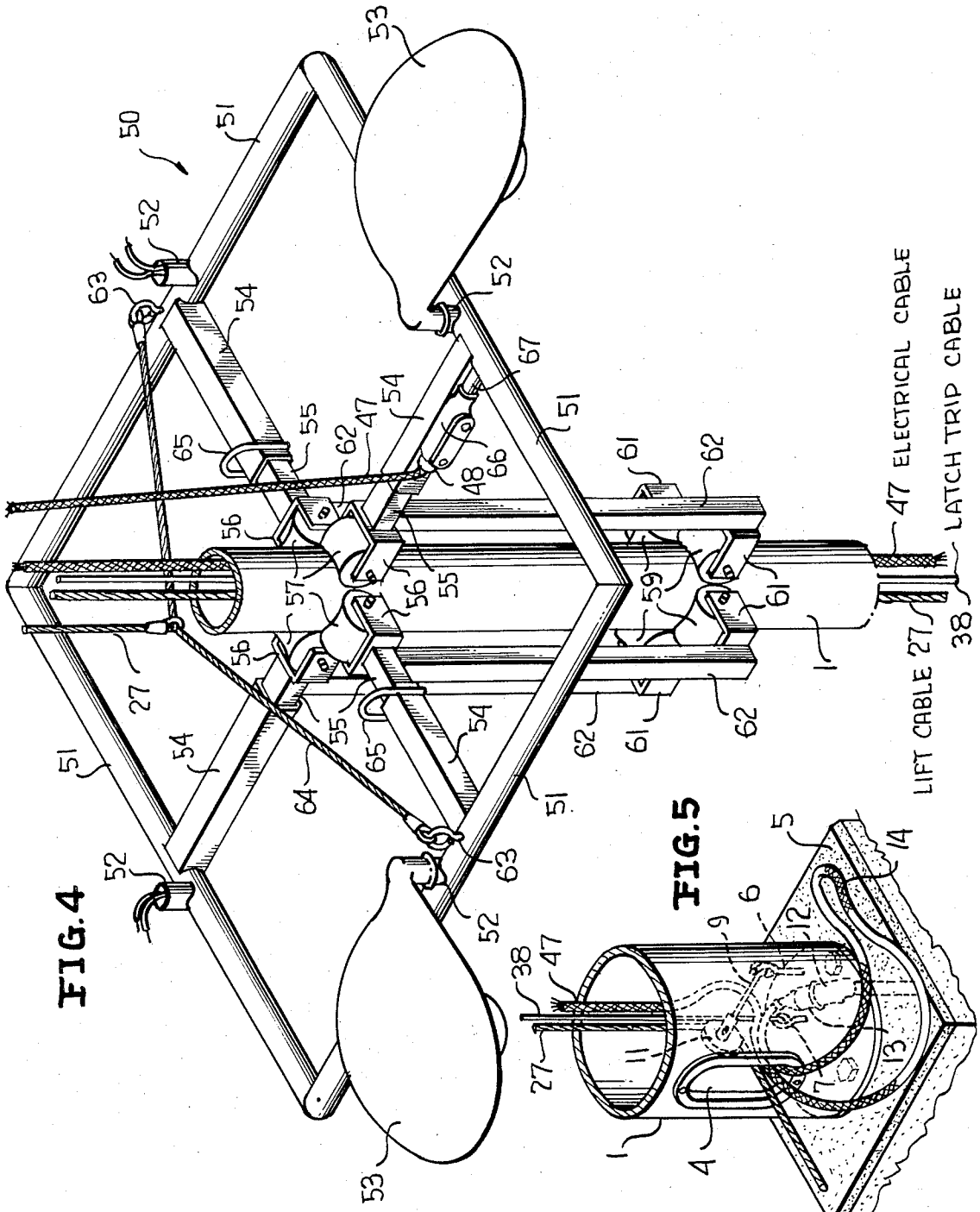


FIG. 4

FIG. 5

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FIG.6

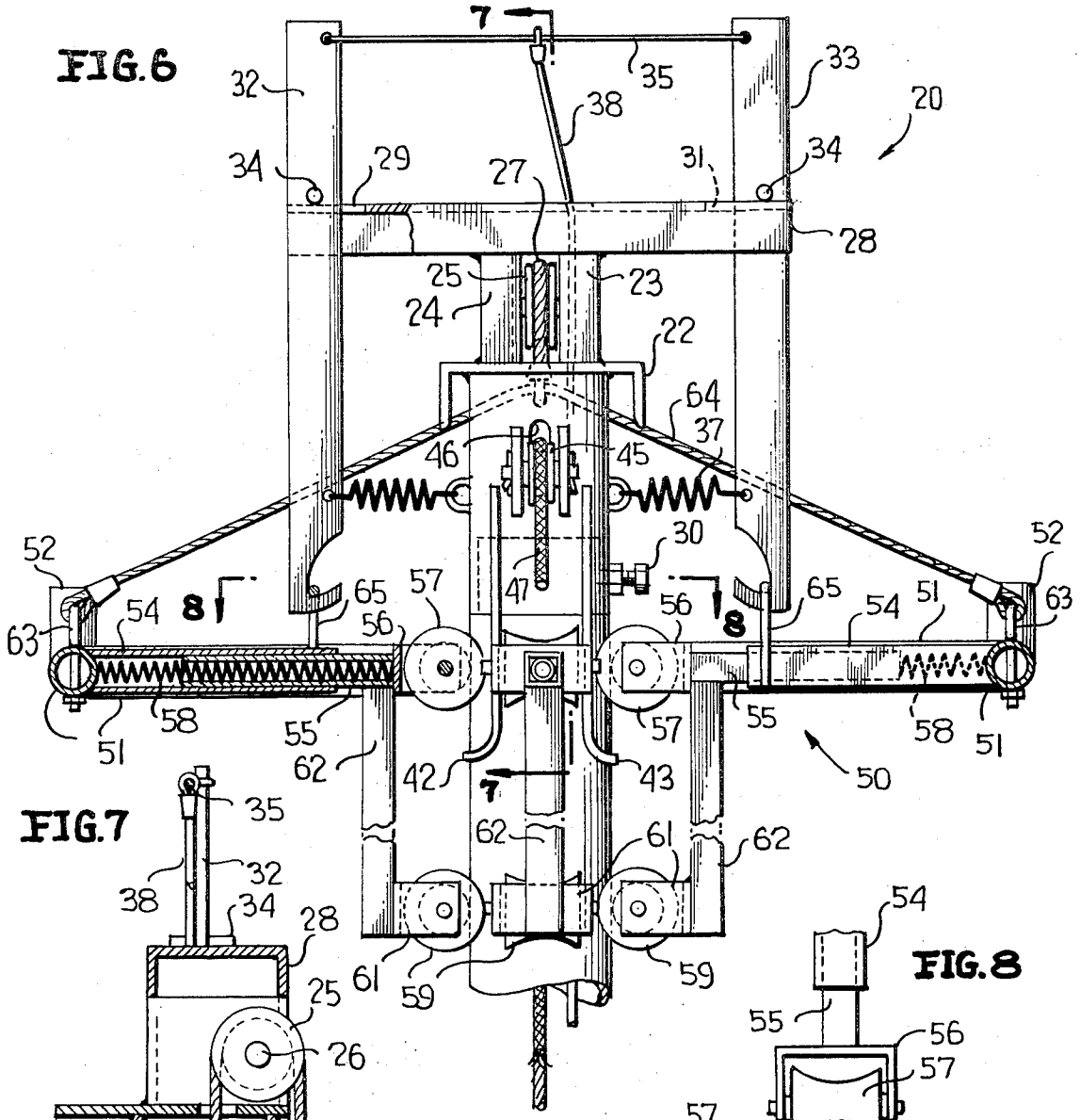


FIG.7

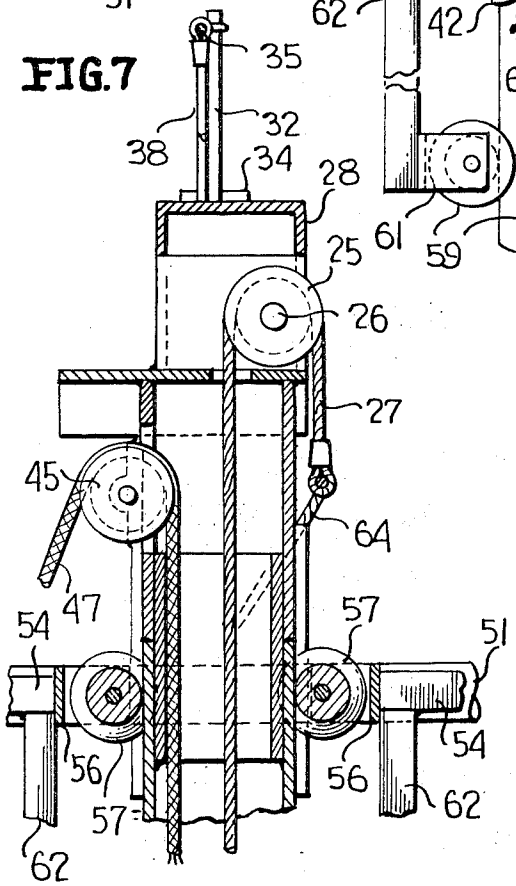
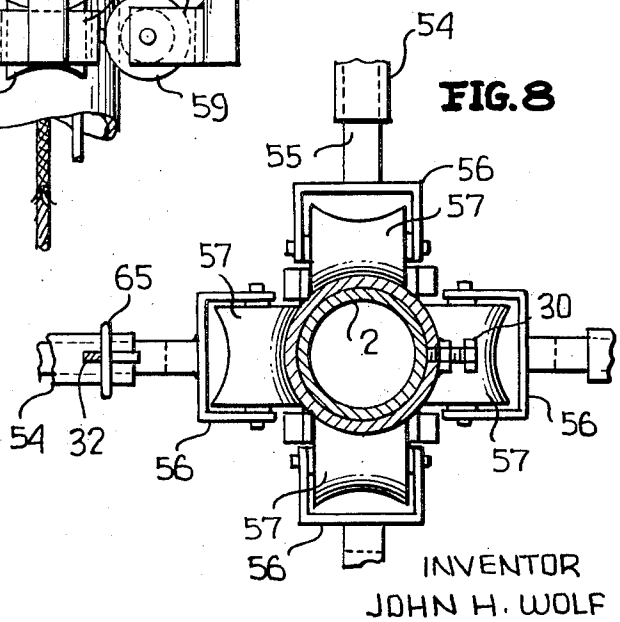


FIG.8



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GROUND LEVEL SERVICE RACK FOR POLE-MOUNTED FIXTURES

BACKGROUND OF THE INVENTION

The present invention relates to improvements in pole mounted electrical equipment and more particularly to such fixtures which can be easily installed on standard support poles and can be serviced at ground level with safe and simple procedures.

Prior art pole-mounted lighting assemblies of the type which can be serviced at ground level are characteristically represented in Swiss Pat. No. 461,636 to Jean Rubeli. Briefly, Rubeli discloses a rack on which one or more lamps are mounted and which are raised or lowered on a vertical support pole by a hoist cable and pulley arrangement. The rack is held in its operative position atop the pole by tension maintained in the hoist cable. Contact between the rack and pole is effected via guide rollers which are urged against the pole as long as there is tension in the hoist cable. Should the hoist cable break, either with the rack atop the pole or during raising or lowering of the rack, the entire rack falls freely to the ground, endangering passersby and maintenance personnel. Moreover, Rubeli's unit is constructed so that the lamp fixtures extend below the remainder of the rack and thereby absorb substantially all of the impact if the rack falls. Consequently these lamp fixtures, which are the most expensive parts of the assembly, are quite likely to be demolished if the rack falls. In addition, installation of Rubeli's assembly requires considerable modification of standard support poles.

It is therefore an object of the present invention to provide a ground level service rack for pole-mounted lighting assemblies and similar electrical equipment whereby the rack is safely latched in its operative position, independent of hoist cable tension, and whereby the entire assembly may be simply installed on standard support poles without modification to the pole itself.

It is another object of the present invention to provide a ground level service rack of the type described where guide sheaves mounted on the rack are urged against the pole at all times, independently of hoist cable tension, thereby slowing the fall of the rack in the event of hoist cable failure during a raising or lowering procedure.

It is still another object of the present invention to provide a ground level service rack of the type described wherein a relatively inexpensive portion of the rack is arranged to absorb most of the impact if the rack falls to the ground.

SUMMARY OF THE INVENTION

The ground level service rack of the present invention includes a latching arrangement to hold the rack in its operative position independently of hoist cable tension. In addition, the rack-mounted guide sheaves are continuously urged against the support pole by compressed springs to provide frictional engagement between the rack and pole and slow any possible fall of the rack. A set of guide sheaves is disposed below the remainder of the rack assembly so that these sheaves receive most of the impact if the rack should fall. The support assembly for the rack is adapted to be mounted on a standard support pole slip-fitter arrangement.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and still further objects, features and advantages of the present invention will become apparent upon consideration of the following detailed description of specific embodiments thereof, especially when taken in conjunction with the accompanying drawings, wherein:

FIG. **1** is a view in elevation of the ground level service rack of the present invention and a support pole therefor, wherein raising, lowering and latching of the rack is illustrated diagrammatically;

FIG. **2** is a view in perspective of a fixed support assembly for the rack as positioned atop the support pole;

FIG. **3** is a sectional view along lines **3—3** of FIG. **2**;

FIG. **4** is a view in perspective of the movable service rack illustrating the manner in which the rack rides the support pole;

FIG. **5** is a view in perspective of the base of the support pole;

FIG. **6** is a plan view in elevation of the movable support rack latched to the support assembly atop the support pole;

FIG. **7** is a side view in section taken along lines **7—7** of FIG. **6**; and

FIG. **8** is a top view in section taken along lines **8—8** of FIG. **6.**

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to FIG. **1,** a support pole **1** of generally cylindrical configuration is arranged to receive a fixed support assembly **20** at its top and is slidably engaged at its periphery by a movable rack assembly **50.** As is described in detail below, rack **50** is normally latched in its operative position by assembly **20** and is selectively raised or lowered along pole **1** from a location at the base of the pole.

Referring now to the drawings, pole **1** includes a top section **2** of reduced diameter extending upwardly from an annular shoulder **3.** Section **2** forms a standard slip-fitter which is engaged by a hollow cylindrical tube **21** forming part of support assembly **20.** Tube **21** rests on shoulder **3** and is interiorly braced by slip-fitter **2.** A set screw **30** is threaded through tube **21** and abuts slip-fitter **2** to lock assembly **20** in place. A U-shaped bracket **22** is welded or otherwise secured to the top of tube **21** in inverted position to provide support for a hoist sheave and a latch arrangement to be described. Two smaller U-shaped brackets **23, 24** are secured along their edges atop bracket **22** in spaced relation. A hoist sheave or pulley **25** is rotatably mounted between brackets **23, 24** by means of shaft **26** which is journaled in each of the brackets and fixedly secured to the pulley. A peripheral track is provided in pulley **25** to accommodate a hoist cable **27.**

A latch assembly includes baseplate **28** in the form of an inverted U-shaped bracket supported atop brackets **23, 24.** Opposite ends of the baseplate are slotted at **29, 31** to receive respective vertically extending latch members **32, 33** in the form of flat plates of steel or other suitable material. The latch members are pivotally mounted to baseplate **28** in the region of slots **29, 31** by means of pivot pins **34** disposed such that both latch members are pivotable in a common plane.

A cable 35 is secured to the upper end of each of latch members 32, 33 and prevents these members from being separated at their upper ends by a distance significantly in excess of the distance between pivot pins 34. Coiled tension springs 36, 37 are provided to normally maintain latch members 32, 33, respectively, in vertical positions. Specifically, spring 36 extends horizontally between pipe 21 and latch member 32 at a location below pivot pin 34. When latch member 32 is vertical spring 36 is relaxed; however, any tendency of latch member 32 to pivot clockwise (as viewed in FIGS. 1, 2) is opposed by spring 36. A similar situation exists for latch member 33 which is opposed from pivoting counter-clockwise by spring 37. The lower extremities of latch members 32, 33 are configured as hooks arranged to engage rack assembly 50 in the manner to be described.

A latch line 38 in the form of a cable is secured to cable 35 and extends down into pole 1 through suitably provided holes in baseplate 28 and bracket 22. The lower extremity of latch line 38 is accessible at the bottom of pole 1, and if pulled downwardly, serves to pivot latch members 32, 33. More specifically, when latch line 38 is so pulled, cable 35 pulls the upper ends of the latch members toward one another, thereby forcing the hooked lower ends of these members to swing outwardly.

Four guide members 39, 41, 42 and 43, in the form of vertically extending plates are edge welded to tube 21 and define guide spaces for the guide sheaves of rack assembly 50 to be described below. The lower portions of guide members 39, 41, 42, 43 extend below tube 21 along pole 1 and are curved to permit the rack guide sheaves to be smoothly guided into position.

A support sheave 45 of nylon or similar material is pivotally mounted on the outer surface of tube 21 proximate a slot 46 in the tube. A portion of support sheave 45 extends through slot 46 into tube 21. The purpose of sheave 45 is to support and carry a power cable 47 which extends upwardly through the interior of pole 1 and out through slot 46 to provide electrical power for rack 50.

Rack assembly 50, as best illustrated in FIGS. 4 and 6, comprises a square or rectangular frame 51 formed by hollow tubing which serves as a conduit for electrical cable. A plurality of short tubes 52 extend upwardly from various locations on the frame and serve as slip-fitters which support various lighting fixtures 53. The number and location of slip-fitters 52 are determined by the lighting requirements of a particular application.

Four hollow tubes 54 extend inwardly of frame 51 from the centers of the four legs respectively, of the frame. Four additional hollow tubes 55 telescope interiorly of tubes 54 and terminate at respective U-brackets 56. The latter pivotally support respective guide sheaves 57 which are contoured to roll vertically along pole 1. A compression spring 58 is provided for each set of telescoping tubes 54, 55 extending interiorly of both tubes to urge sheave 57 against pole 1.

The four guide sheaves 57 are generally co-planar with frame 51. There are four additional guide sheaves 59 pivotally supported by respective U-brackets 61 below the frame. Brackets 61 are in turn supported by vertical beams 62 secured to respective tubes 55. Thus, since tubes 55 and sheaves 57 are urged by compression springs 58 toward pole 1, the lower set of guide sheaves 59 are similarly urged by the same springs.

A pair of eye bolts 63 are secured to and extend upwardly from frame 51 at the centers of a pair of opposite frame legs. A hoist bridle 64, in the form of a steel cable, is secured at its ends to bolts 63 and has sufficient slack to permit it to clear the main plane of frame 51 when bridle 64 is lifted. Bridle 64 is secured to hoist cable 27 which, as described below, is employed to raise and lower rack 50 along pole 1.

A pair of U-bolts 65 have their legs secured to an opposite pair of tubes 54 at radial distances from pole 1 which are sufficient to permit bolts 65 to be engaged by the hooked lower ends of latch members 32, 33. In the manner to be described, engagement of these bolts by the latch members supports rack 50 in its operating position, independently of tension in hoist cable 27.

An electrical power connector 66 is secured to one of tubes 54 of frame 51. Connector 66 mates with a plug 48 at one end of power cable 47, which rides up and over support sheave 45 into the interior of pole 1 and terminates at its other end in electrical connector 49. A conduit 67 carries electrical wires from connector 66 to the interior of frame 51.

At the base of pole 1, as best illustrated in FIGS. 1 and 5, is an access opening 4 by which maintenance personnel can have ground level access to hoist cable 27, power cable 47 and latch line 38. The base of pole 1 is set rigidly in a cement block 5 into which eye bolts 6 and 7 and conduit 8 are set. A shackle 9 mates at one end with eye bolt 6 and pivotally supports a sheave 11 for hoist cable 27. Cable 27 may be connected to a winch (not illustrated) or the like by means of loop 27a exteriorly of access opening 4 for the purpose of raising or lowering rack assembly 50.

Latch line 38 is permanently tied or otherwise secured to eye bolt 7 such that line 38 is taut when latch members 32, 33 are vertical. A downward pull on latch line 38 tends to pivot the upper ends of the latch members toward one another by forcing cable 35 in a downward direction.

The exposed end of conduit 8 terminates in a connector 12 which mates with either connector 13 of a service cable 14 or connector 49 of power cable 47. More particularly, when rack assembly 50 is in its operative position atop pole 1, power cable 47 extends to the base of pole 1 permitting connectors 12 and 49 to be mated. When the rack is lowered, cable 49 is disconnected from connector 12 and electrical connections to the cable are provided via service cable 14. For this purpose, the upper end of cable 14 terminates in connector 15 which mates with connector 49.

To illustrate the advantages of the present invention, assume rack assembly 50 is at ground level and is to be raised to its operative position atop pole 1. Hoist cable 27 is pulled, with sheaves 11 and 25 re-directing the hoisting force, to raise rack 50 by means of bridle 64. As the rack is hoisted up the pole, compression springs 58 urge the eight guide sheaves 57, 59 against the pole. Importantly, if cable 27 were to snap during a hoisting operation, springs 58 remain in compression and continue to urge the eight guide sheaves 57, 59 against pole 1. The fall of rack assembly 50 would therefore be considerably slowed and danger to personnel on the ground would be minimized. Moreover, if the rack assembly were to fall, the lower set of guide sheaves 59

would absorb most of the impact and the possibility of damage to lamp fixtures **53** would be quite small.

When rack assembly **50** is hoisted to the top of pole **1**, U-bolts **65** come into contact with the bottom edges of latch members **32, 33.** These edges are sloped upwardly toward the pole so that upward pressure by the U-bolts against the sloped edges tends to pivot the lower ends of the latch members outwardly against the tension in springs **36, 37.** Hoisting of the rack is continued until bolts **65** rise above the sloped lower edges of the latch members at which point the latch members are pulled back into their vertical positions by springs **36, 37.** Tension in hoist cable **27** is then released and bolts **65** settle into engagement with the hooked lower regions of latch members **32, 33.** Rack assembly **50** is therefore supported in this, its operative position, by the latch members.

Proper rotational alignment of the rack at the top of pole **1** is assured by virtue of sheave guides **39, 41, 42** and **43.** Specifically, these guides define four spaced regions about the periphery of the top of pole **1** within which sheaves **59** fit. The flaring lower ends of the guides act to direct the hoisted sheaves into the spaced regions to assure proper positioning of the rack.

When the rack is in its operative position, power cable **47** extends to the base of the pole and can be connected to fixed connector **12.**

If now it is desired to lower rack **50** for maintenance purposes, power cable connector **49** is disconnected from connector **12** and service cable **14** is connected between these two connectors. Hoist cable **27** is placed in tension and the rack is raised slightly. Latch line **38** is then pulled downward, pivoting the hooked lower ends of latch members **32, 33** outwardly, U-bolts **65** having been raised sufficiently to permit them to be cleared by the hooks. Tension on the hoist cable is then slowly released to permit lowering of the rack assembly. Latch line tension is released after the rack is lowered sufficiently to permit U-bolts **65** to clear the hooked latch members. Lowering of rack assembly **50** is continued by means of hoist cable **27** until the rack assembly reaches ground level. If hoist cable **27** should fail during rack lowering, fall of the rack is once again considerably slowed by guide sheaves **57, 59** which are urged against the pole by springs **58.**

While pole **1** illustrated herein is of cylindrical configuration, having substantially constant diameter throughout its length, it is also contemplated that a generally conical support pole may be employed. Such a support pole increases in diameter from top to bottom and therefore is engaged at its lower end with greater frictional force by the spring-biased guide sheaves **57, 59.** Thus, a falling rack assembly on a conical support pole experiences increasing friction the further it falls.

Important, also, is the fact that the assembly of the present invention is readily adapted to mounting on standard support pole slip-fitters without the need for cutting, welding, drilling, tapping or other modification. This feature has significant economic advantages since standard poles may be fitted with the arrangement of the present invention. In addition, since conduit **8** and bolts **6** and **7** are set in cement block **5,** no modification is required of the standard pole at its base for purposes of the present invention.

While I have described and illustrated specific embodiments of my invention, it will be clear that variations of the details of construction which are specifically illustrated and described may be resorted to without departing from the true spirit and scope of the invention as defined in the appended claims.

I claim:

1. An electrical fixture assembly adapted to be mounted on a generally vertical support pole, comprising:

a fixed mounting assembly secured to said pole at a predetermined elevation;

a rack assembly positioned about said pole for slidable movement along said pole, said rack assembly supporting at least one electric fixture and including: a plurality of guide sheaves arranged to movably engage said pole, and a plurality of spring members for continuously urging respective ones of said guide sheaves against said pole; and

hoisting means secured to said fixed mounting assembly and including a hoist cable accessable at ground level and secured to said rack assembly, said hoisting means being provided for selectively raising and lowering said rack assembly along said pole;

wherein a portion of said rack assembly is disposed at a lower level than any electrical fixutres supported by said rack assembly, said portion of said rack assembly acting as a shock absorber to prevent damage to said light fixture in the event said rack assembly falls to the ground.

2. The combination according to claim **1** further comprising latch means for supporting said rack assembly at said predetermined elevation, said latch means including at least one pair of co-operating members arranged for mutual engagement when said rack assembly is at said predetermined elevation, and latch control means for selectively dis-engaging said members to permit lowering of said rack assembly.

3. The combination according to claim **1** wherein said portion of said rack assembly includes a plurality of said guide sheaves.

4. The combination according to claim **1** wherein said hoisting means comprises a hoist sheave secured to said fixed mounting assembly and a bridle secured to said rack assembly, said hoist cable being secured at one end to said bridle, supported by said hoist sheave, and extending to ground level interiorly of said pole.

5. The combination according to claim **4** wherein there is further provided an electrical supply outlet at the base of said pole and interiorly thereof, an electrical connector secured to said rack assembly for receiving electrical power and supplying same to said electrical fixtures, and a power cable for interconnecting said electrical supply outlet to said electrical connector when said rack assembly is at said predetermined elevation, said power cable extending interiorly of said pole between said supply outlet and at least said predetermined elevation.

6. The combination according to claim **5** wherein said electrical fixtures are lighting fixtures.

7. The combination according to claim **1** including latch means comprising a pair of spring-biased hook members secured to said fixed mounting assembly, a pair of further members secured to said rack assembly and adapted to be engaged by respective ones of said hook members, and a latch line extending from said hook members to ground level interiorly of said pole, said latch line being arranged, when pulled, to disen-

gage said hook members from said further members.

8. The combination according to claim **1** wherein a plurality of said guide sheaves are disposed below the remainder of said rack assembly and particularly below said electrical fixtures.

9. The combination according to claim **1** wherein said spring members are compression springs, and wherein said predetermined elevation is the top of said pole.

* * * * *