

Jan. 1, 1946.

W. WILSON

2,391,936

RAISING AND LOWERING APPARATUS FOR ELECTRIC LIGHTING FIXTURES

Filed Sept. 6, 1943

3 Sheets-Sheet 1

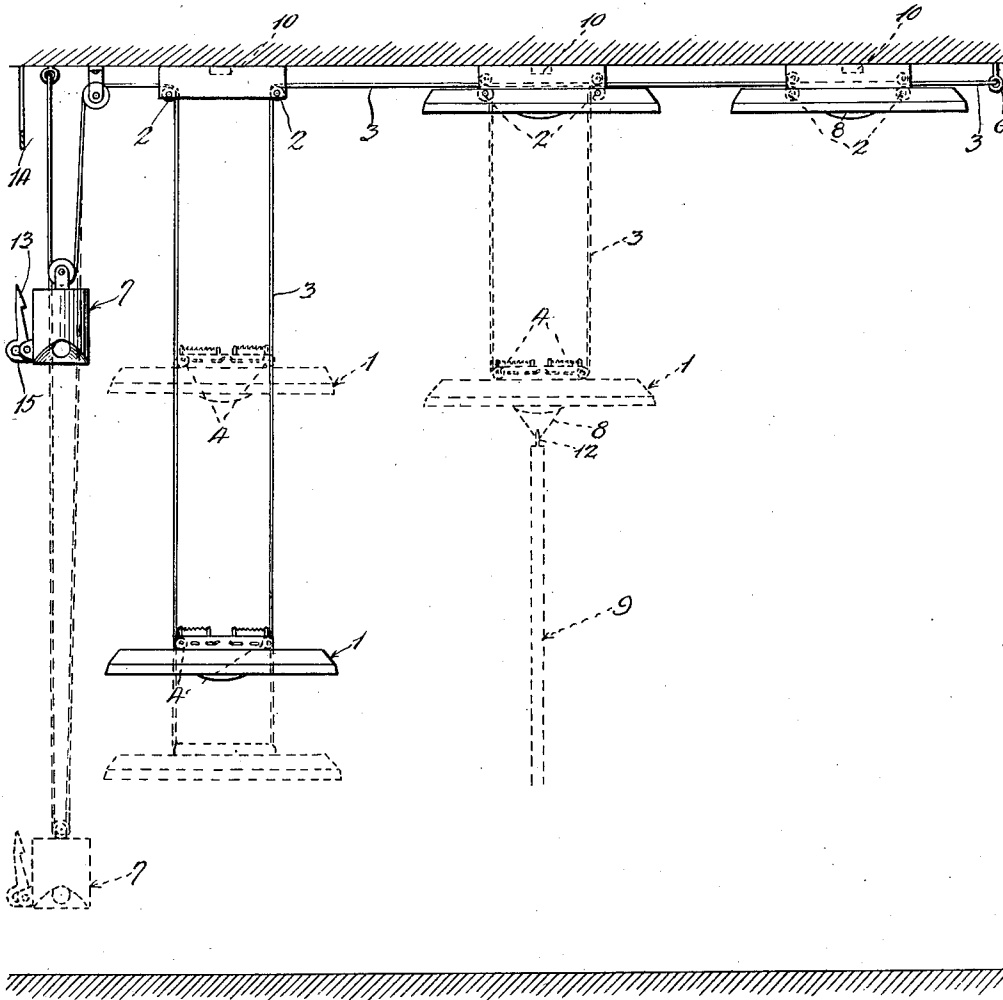


Fig. 1

Inventor:
Wesley Wilson

Jan. 1, 1946.

W. WILSON

2,391,936

RAISING AND LOWERING APPARATUS FOR ELECTRIC LIGHTING FIXTURES

Filed Sept. 6, 1943

3 Sheets-Sheet 2

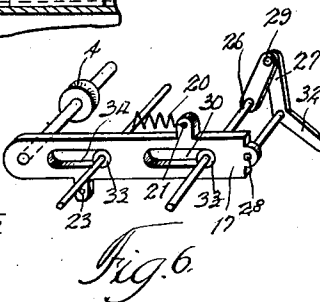
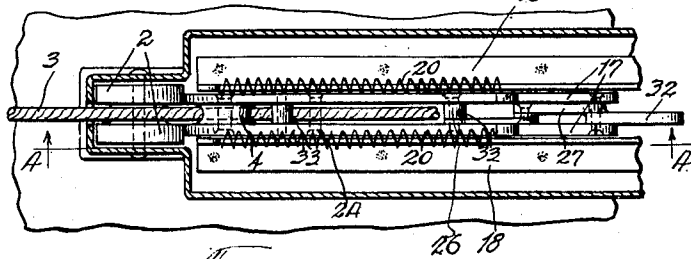
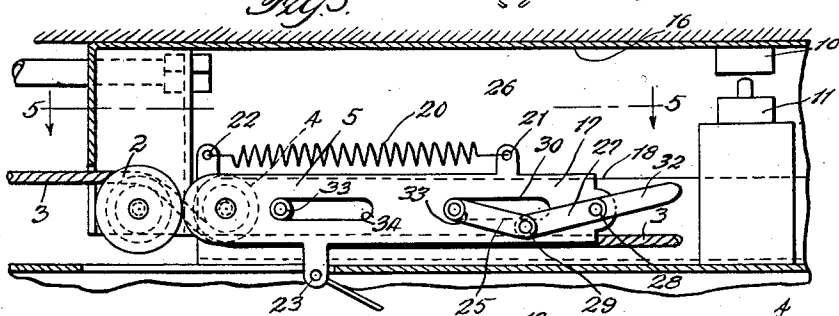
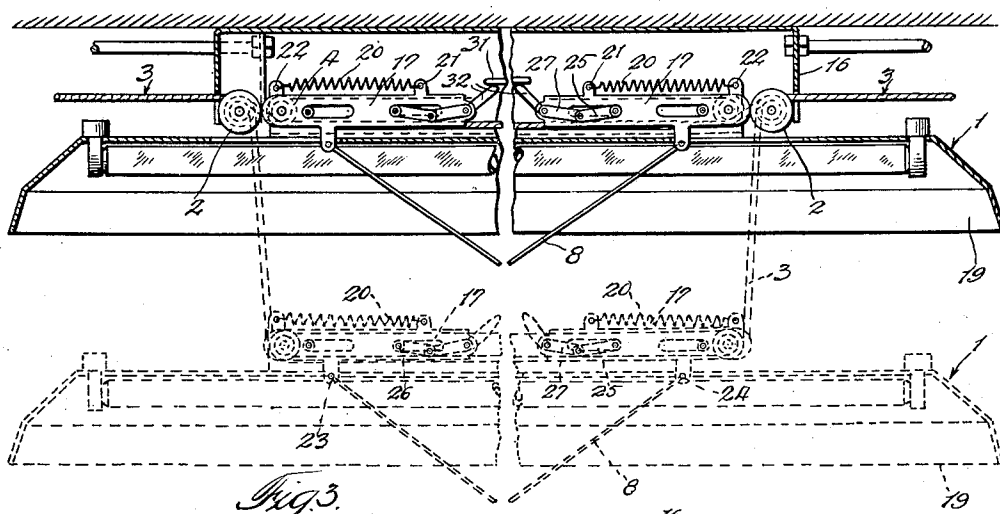
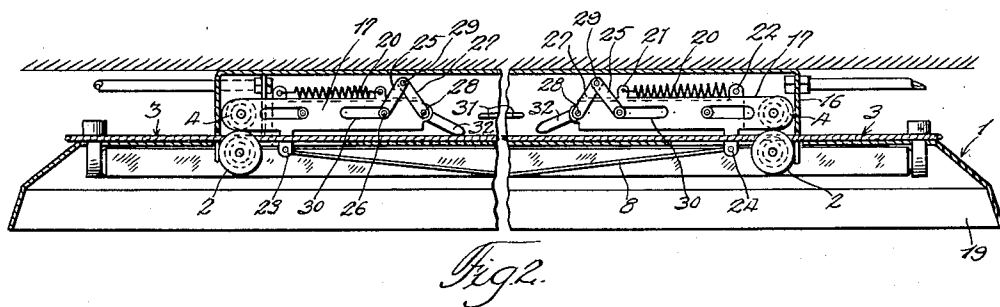


Fig. 5.

Inventor:
Wesley Wilson.

Jan. 1, 1946.

W. WILSON

2,391,936

RAISING AND LOWERING APPARATUS FOR ELECTRIC LIGHTING FIXTURES

Filed Sept. 6, 1943

3 Sheets-Sheet 3

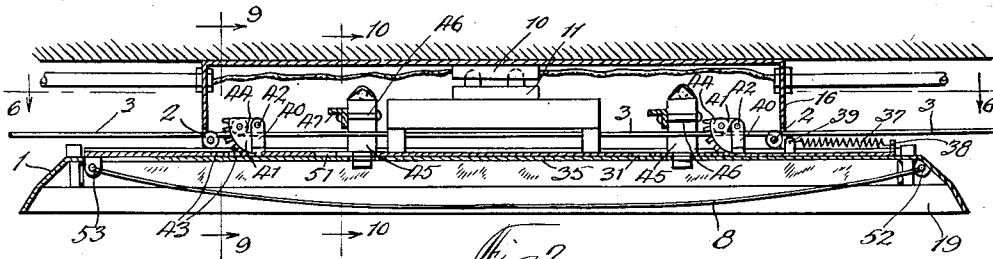


Fig. 7

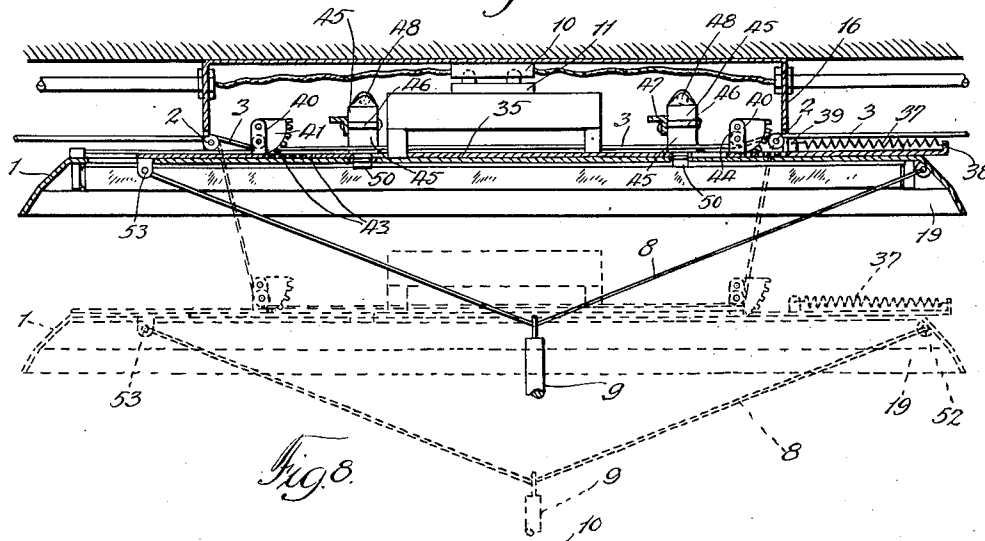


Fig. 8

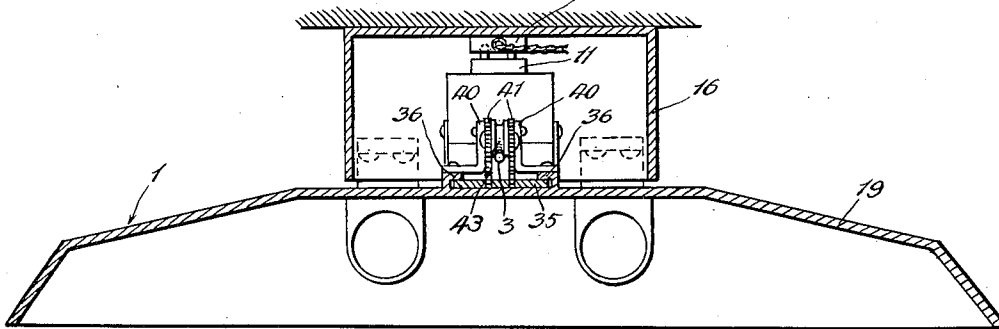


Fig. 9

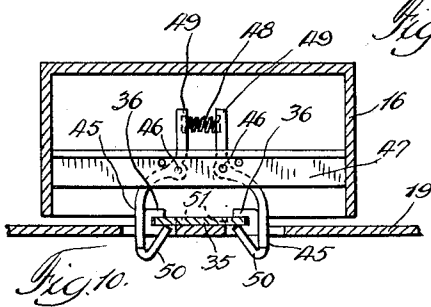


Fig. 10

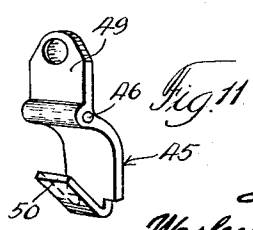


Fig. 11

Inventor:
Wesley Wilson

UNITED STATES PATENT OFFICE

2,391,936

RAISING AND LOWERING APPARATUS FOR
ELECTRIC LIGHTING FIXTURES

Wesley Wilson, Chicago, Ill.

Application September 6, 1943, Serial No. 501,406

14 Claims. (Cl. 248—320)

My invention relates to electric lighting fixtures and to raising and lowering apparatus for electric fixtures.

One of the objects of my invention is to provide improved apparatus for use with a plurality of overhead lighting fixtures using a common elongated flexible tension element, such as a cable, for all of the fixtures and having provisions whereby any one of the plurality of fixtures may be readily disconnected by an attendant on the floor underneath and drawn down to bring the fixture within reach of the attendant for servicing, inspection, etc.

Another object is to provide an overhead lighting system comprising a plurality of fixtures and an elevated means engaging the various fixtures, said means being restricted so that when one fixture is completely lowered, it is incapable of lowering another.

Another object is to provide a construction in which the flexible extension element is relatively free from curvature as it passes through the unlabeled fixtures.

Another object is to balance out the fixture weight as it is being raised and lowered.

Other objects and advantages of the invention will be apparent from the description and claims.

In the drawings, in which two embodiments of my invention are shown,

Figure 1 is a side elevational view showing a plurality of overhead electric fixtures, one of the fixtures being unlatched and drawn partially down to a position for inspection and servicing;

Fig. 2 is a longitudinal vertical view showing a fixture latched in overhead position;

Fig. 3 is a view similar to Fig. 2, but showing the fixture unlatched and partially lowered;

Fig. 4 is an enlarged vertical axial sectional view substantially on the line 4—4 of Fig. 5, showing a detail of the latch and cable suspension;

Fig. 5 is a horizontal sectional view on the line 5—5 of Fig. 4;

Fig. 6 is an exploded perspective view showing details of the latch mechanism;

Fig. 7 is a vertical axial sectional view similar to Fig. 2, but showing a different form of latch mechanism;

Fig. 8 is a vertical axial view similar to Fig. 7, but showing the fixture disconnected and partially lowered;

Fig. 9 is a section substantially on the line 9—9 of Fig. 7;

Fig. 10 is a section substantially on the line 10—10 of Fig. 7; and

Fig. 11 is a detail perspective view of one of the latch members.

Referring to the drawings in detail, and first to Figs. 1-6, inclusive, the construction shown therein comprises a plurality of overhead lighting fixtures, a plurality of spaced pairs of overhead latch pulleys 2, and an elongated flexible tension element 3, such as a cable engaging said overhead pulleys, a plurality of pairs of pulleys 4, one pair for each fixture engaging said cable 3, a pair of slidable latch members 5 on which the pulleys 4 are mounted, one pair carried by each fixture for latching the fixtures in overhead position by engagement with the latch pulleys 2, anchorage means 6 for one end of the cable, counterweight means 7 for exerting tension on the other end of the flexible element, means comprising a flexible element 8 such as a cable connected to said slidable latch means 5, respectively, and engageable by a tool 9 manipulated by an operator standing on the floor for releasing the fixture from its latched condition and drawing it down to a position for servicing and repair, overhead electric connector elements 10, one for each fixture, and connector elements 11, one carried by each fixture for engaging an overhead connector element 10 when the fixture is drawn up to overhead position.

Before describing the construction of the apparatus in detail, its operation will be briefly outlined. Let it be assumed that all of the fixtures are in overhead connected position and that the counterweight 7 is in its lowered dotted-line position shown in Fig. 1. If the attendant desires to disconnect and pull down any one of the overhead fixtures, he will reach up with the unlatching and lowering tool 9 and engage the hook 12 with the releasing cable 8 of the fixture to be drawn down. By pulling down on the fixture, the latch is released so that further downward movement of the tool 9 will draw the fixture down against the action of the counterweight. The counterweight may be provided with a latch member 13 engageable with an overhead keeper member 14 so that when the fixture is drawn down to its fully lowered position, the counterweight will be latched in overhead position and will not then act to tend to raise the fixture. When it is desired to return the fixture to its overhead position, the counterweight latch is released in any suitable manner, as by engaging the lowering tool with the hook portion 15 of the latch and pulling down to release the latch, whereupon the counterweight will move downwardly and, through the flexible

element 3, will raise the fixture to its overhead position where said fixture will be automatically latched in its normal overhead position. In the final upward movement of the fixture, the electrical connector element 11 on the fixture will engage the overhead connector element 10 to complete the electric circuit. The hood portion 16 of the fixture is permanently secured in overhead position, and the pulleys 2 are suitably mounted in the hood.

The latch construction shown comprises a pair of slides or plungers 17 movable toward and from each other and mounted between angle iron guide plates 18 secured to the reflector part 19 of the fixture. The rounded ends of these slides cooperate with the pulleys 2 to effect the latching and unlatching operation. In the latched position shown in Fig. 2, the slides are extended so as to overlie the pulleys 2 and hold the fixture in overhead position. In Fig. 3 the slides have been retracted so as not to overlie the pulleys 2, thus releasing the reflector from the hood and allow it to be drawn downwardly. The slides are biased to extended latching position by means of coil tension springs 20, one end of a spring being secured at 21 to a slide and the other end being secured at 22 to a guide. The releasing cable 8 has its ends secured at 23 and 24 to the slides, respectively, so that a downward pull on the cable 8 will draw the slides toward each other against the biasing action of the slide extending springs 20. After the reflector is disconnected from the hood, the weight of the reflector and parts carried thereby is preferably not sufficient to cause the suspension cable 3 to hold the latch members in withdrawn position against the biasing action of the springs 20. In order to insure that the latches 17 will be retained in withdrawn position when the fixture is unlatched, a toggle mechanism is provided for each latch member, comprising an arm 25 pivotally mounted on a pin 26 extending between and secured to the guides, and an arm 27 pivotally connected at 28 with the slide and pivotally connected at 29 to the other arm of the toggle. The slide is provided with a clearance slot 30 through which the pin 26 on which the toggle arm is mounted extends. When the cable 8 is pulled down to retract the latch members to unlatching position, as shown in Fig. 3, the weight of the toggle arms will cause them to move from the position shown in Fig. 2 to the position shown in Fig. 3, past the dead center point of the toggle so that the biasing action of the springs 20 cannot extend the latch members. In order to release the toggles when the fixture is being pulled up into latched position, abutment means 31 may be provided in the hood 16 engaged by the extension 32 of the arms 27 of the toggles in the final raising movement of the fixture to break the toggle and allow the biasing springs 20 to move the latch members to the latching position shown in Fig. 2. The latch slides 17 may be mounted on the guides 18 by means of rollers 33 operating in slots 34 and 30 in the slides, the rollers being mounted on bearing pins secured to the angle iron guides 18.

The construction shown in Figs. 7-11, incl., is similar to that just described so far as the elements 1, 2, 3, 6-15, inclusive, and 19 are concerned. A different form of latch mechanism is employed. That part of the latch mechanism mounted on the reflector part 19 of the fixture which is to be lowered comprises an elongated bar 35 extending substantially from one end to the other of the reflector and slidably mounted

in guide lugs 36 thereon, a coil tension spring 37 connected at 38 to the slide 35 and connected at 39 to the reflector 19, two pairs of pulley supporting standards 40 secured to the reflector, two pairs of segmental gears 41 pivotally mounted at 42 on the standards and meshing with rack perforations 43 in the slide, and two pulleys 44, one pair mounted on each pair of segment gears 41 and engaging the raising and lowering cable 3 which runs over the pulleys 2 mounted on the hood.

That part of the latch mechanism mounted on the hood comprises two pairs of latches 45, each pair comprising two latches pivotally mounted at 46 on a crossbar 47 extending transversely of the hood and secured thereto, and a coil compression spring 48 acting between the upwardly extending arms 49 of the latch members to force the lower hook-like portions 50 of the latch members toward each other so as to engage underneath the slide 35 when the reflector is in raised position. These hook-like portions are downwardly divergent as shown in Fig. 10 to facilitate the entry of the latch member 35 between the hook-like members as the fixture is being drawn up into latched position. The latch member 35 is provided with suitable lateral recesses 51 positioned so that when the latch slide is moved to the right-hand position shown in Fig. 8, these lateral recesses or notches in the latch bar will register with the hooks 50 on the pivoted latch members 45 to enable the latch bar or slide 35 to drop downwardly so that the fixture can be drawn down for inspection or cleaning. The releasing cable is secured at one end 52 to the reflector and at the other end at 53 to a lug on the slide. When the pole 9 is hooked onto the cable 8 and pulled downwardly, it will cause the latch slide 35 to move to the right from the position shown in Fig. 7 to the position shown in Fig. 8, in which the slide will be in releasing position. This movement of the slide to unlatching position will rock the quadrant gears 41 from the position shown in Fig. 7 to the position shown in Fig. 8 to move the pulleys 44 downwardly, causing the cord or cable 3 to be inclined between the pulley 2 and the pulley 44 (as shown in Fig. 8) so that when the weight of the fixture comes on the cord 3, it will not cause too rapid downward movement.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In an overhead lighting system, overhead supporting means, an elongated flexible tension element engaging said supporting means and guided thereby, a plurality of lighting fixtures carried by said tension element, each carrying connector means, and means carried by each fixture engaging said flexible tension element for supporting said fixture, said system being provided with overhead connector means cooperating with said fixture-carried connector means for releasably holding said fixture in the overhead position.

2. In an overhead lighting system, a plurality of spaced pairs of overhead supporting means, an elongated flexible tension element engaging said supporting means and guided thereby, a plurality of lighting fixtures carried by said tension element, one for each pair of supporting means, and means carried by each lighting fixture, each of said last mentioned means engaging said flexible element between the engagement of the flexible element with a pair of said supporting means, said system being provided with connector means carried by each fixture

and with overhead connector means cooperating with said fixture carried connector means for releasably holding said fixture in overhead position.

3. An overhead supported vertically adjustable lighting fixture construction comprising a fixture and supporting means mounted on said fixture for engagement with a supporting flexible vertically adjustable loop, both ends of which loop are supported overhead.

4. An overhead supported vertically adjustable lighting fixture construction comprising a fixture and pulleys having longitudinally spaced axes mounted on said fixture for rolling engagement with a supporting flexible vertically adjustable loop, both ends of which loop are supported overhead.

5. An overhead supported vertically adjustable lighting fixture construction comprising a fixture, pulley means mounted on said fixture for rolling engagement with a supporting flexible vertically adjustable loop, both ends of which loop are supported overhead, interengaging connector means mounted on said fixture and cooperating with overhead connector means for holding the fixture in raised position, said fixture mounted connector means having spaced attaching means thereon, and means connected to said spaced attaching means and engageable and operable by an attendant on the floor for disengaging said connector means on said fixture from said overhead connector means and pulling the fixture downwardly from its raised position.

6. An overhead support for a vertically adjustable lighting fixture construction comprising an elongated flexible tension element, overhead pulley means for supporting said tension element to provide a plurality of vertically adjustable loops, both ends of each loop being supported overhead, a plurality of vertically adjustable lighting fixtures, and pulley means mounted on each fixture for rolling engagement with said loops, respectively, for vertical adjustment of the fixture.

7. In an overhead electric distribution system, an elongated flexible tension element, a plurality of overhead supporting means for supporting and guiding said tension element to enable the tension element to be drawn down in loop formation between pairs of supporting means, a plurality of electric translating devices, each carrying means engaging one of said loops and supported thereby, spaced overhead electric connector elements, one for each device, and electric connector elements, one carried by each device for engaging the corresponding overhead electric connector element.

8. In an overhead lighting system, a plurality of spaced overhead supporting means arranged in pairs; an elongated flexible tension element extending successively over and in contact with each of said supporting means and having excess length to provide slack between said supporting means; means to take up said slack and to maintain said tension element taut across said supporting means, said slack permitting said tension element to be flexed downwardly between adjacent pairs of supporting means to form one or a plurality of depending loops; and a plurality of lighting fixtures each having means thereon engaging said tension element for suspension respectively of said lighting fixtures from said loops.

9. In an overhead lighting system, a plurality

of spaced overhead supporting means arranged in series; an elongated flexible cable extending successively over said supporting means and anchored at its opposite ends, said cable having excess length between said anchored ends to provide slack and being adapted to be looped downwardly between adjacent supporting means of said series at any one of a plurality of points along the length of said cable; a plurality of lighting fixtures each having means respectively engaging said cable at said points; and take-up means acting on said cable intermediate said ends and movable in one direction to maintain said cable taut at said points with the fixtures in their raised positions, and movable in an opposite direction to provide slack in said cable to permit the formation of a loop extending downwardly at any one of a plurality of points along the length of said cable whereby any one or more of said lighting fixtures may be lowered from raised position.

10. An overhead supported, vertically adjustable lighting fixture construction comprising a fixture and supporting means mounted on said fixture and engaging with a supporting flexible, vertically adjustable loop, both ends of which loop are supported overhead; a fixed overhead casing for said fixture; a latch carried by said fixture which, when in extended position, engages said fixed casing and retains said fixture in its normal overhead supported position; resilient means for moving said latch to said extended position; means for releasing said latch against the action of said resilient means to permit said fixture to be moved downwardly with respect to said casing; means for retaining said latch in its released position against the action of said resilient means when said fixture is in its lowered position; and means associated with the casing and engageable by said latch retaining means as said fixture contacts said casing to release the latch retaining means to permit said resilient means to move said latch into latching position with respect to said casing whereby said fixture is retained in its overhead position.

11. An overhead supported, vertically adjustable lighting fixture construction as defined in claim 10, wherein the means for retaining said latch in its released position against the action of said resilient means is a toggle, and wherein the means associated with the casing and engageable by the toggle for releasing the latch retaining means is an abutment.

12. An overhead-supported vertically-adjustable lighting fixture construction comprising two pulleys adapted to be supported in overhead position, an elongated flexible tension element having opposite ends adapted to extend respectively for rolling engagement over said pulleys in opposite directions and having an intermediate portion adapted to be flexed from a taut substantially straight run downwardly between said pulleys to define a depending loop, a lighting fixture, and supporting means on said fixture and adapted for self-centering engagement with said intermediate portion of said element to suspend said fixture from the lower end of said loop, said opposite ends being adapted to be anchored overhead, with at least one of said ends being yieldable to pay a portion of said element into or out of said loop whereby to lengthen, shorten, or take up said loop so as to locate said fixture selectively in overhead position or various lowered positions.

13. An overhead-supported vertically-adjustable lighting fixture construction comprising two

guides adapted to be supported in overhead position, an elongated flexible tension element having opposite ends adapted respectively to run over said guides and having an intermediate portion adapted to be flexed downwardly from said guides to define a vertically adjustable depending loop, a lighting fixture, and supporting means mounted on said fixture and adapted for engagement with said intermediate portion of said element to suspend said fixture centrally from said loop, said element being selectively payable into or out of said loop to enlarge or diminish said loop, whereby to adjust the vertical position of said fixture.

14. An overhead-supported vertically-adjust-

able lighting fixture construction comprising overhead supporting means, a tension element engaging said supporting means and defining a flexible vertically adjustable loop having oppositely extending ends, a lighting fixture, and supporting means mounted on said fixture and adjustably engaging said loop to suspend said fixture from the lower end of said loop, either end portion of said element being adapted to be payed into said loop to lengthen said loop or to be payed out of said loop to shorten or take up said loop, whereby to adjust the vertical position of said fixture.

WESLEY WILSON.