United States Patent

Meyer

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[45] Aug. 22, 1972

[54] **REMOTE FIXTURE LOWERING DEVICE**

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[52] **U.S. Cl.** **240/84**, 240/63, 240/69, 240/88

[51] **Int. Cl.** **F21s 1/10**

[58] **Field of Search**.....240/63, 69, 84, 88

[56] **References Cited**

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Primary Examiner—Samuel S. Matthews

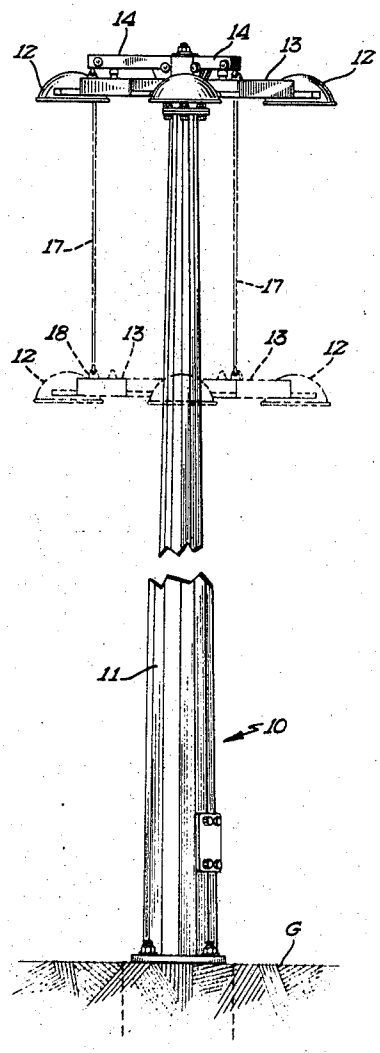
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[57] **ABSTRACT**

A tower supporting a light fixture at an elevated location on support cables trained over pulleys at the top of the tower and also suspending a counterweight which holds the fixture upwardly against the tower brackets. The counterweight being removably attached to the cables and also removably carrying a winch with a winch cable also removably attached to the support cables.

8 Claims, 5 Drawing Figures



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2 Sheets-Sheet 1

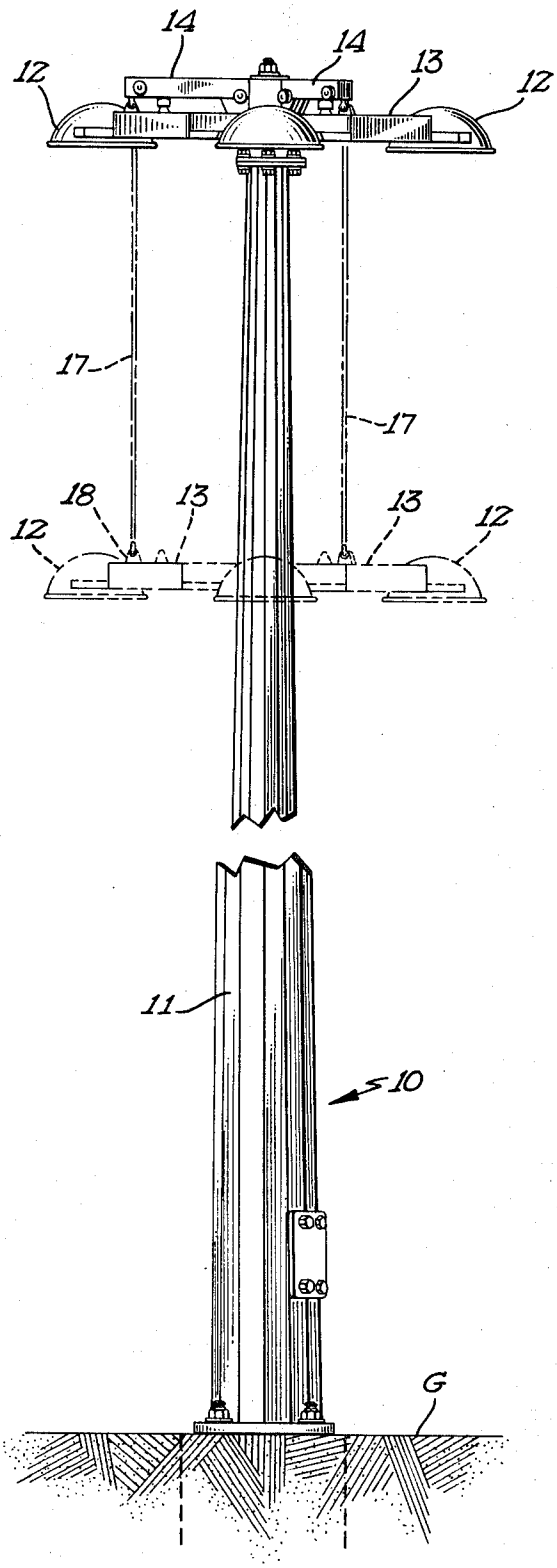


Fig 1

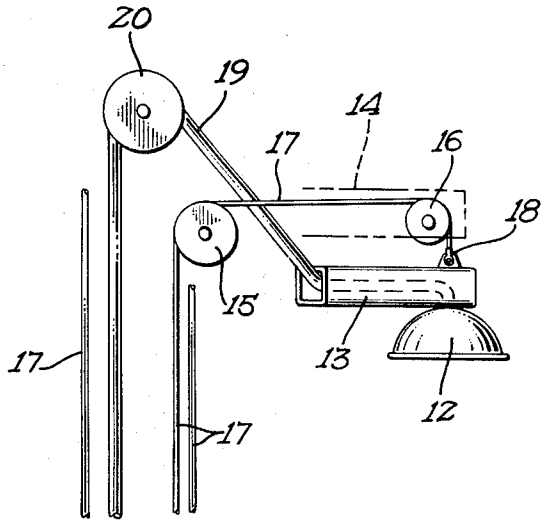


Fig 2

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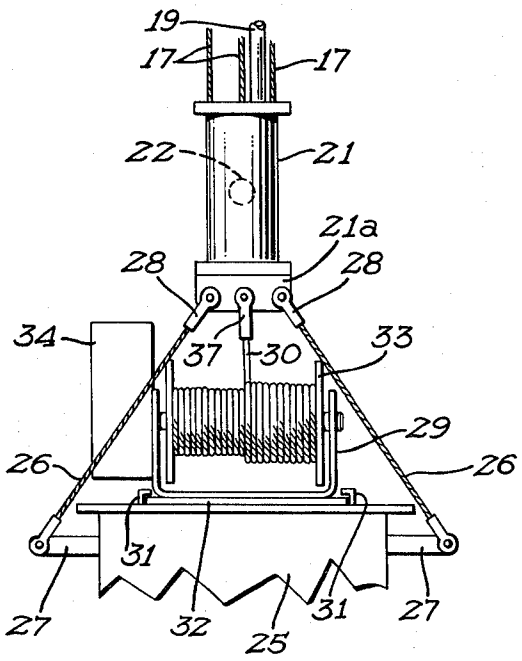


Fig 4

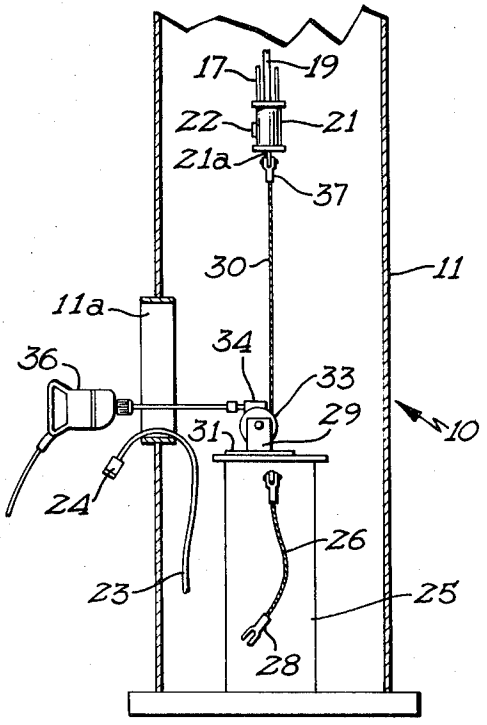


Fig 5

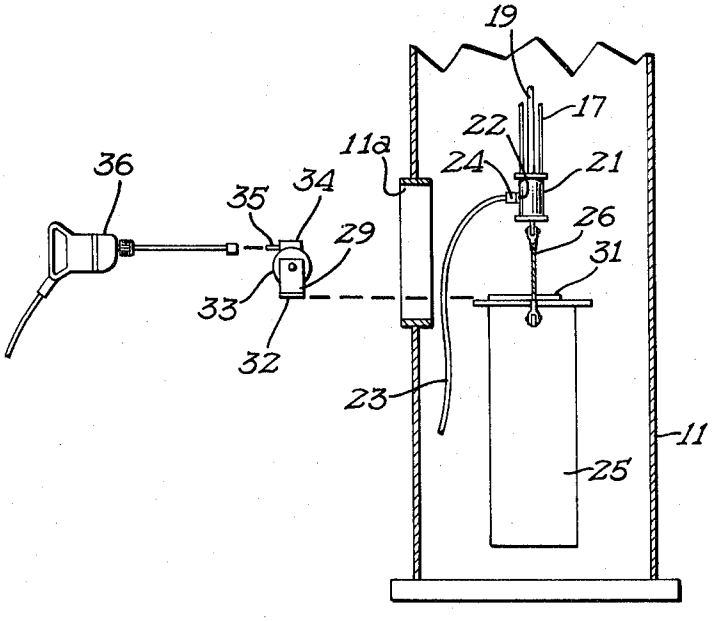


Fig 3

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REMOTE FIXTURE LOWERING DEVICE

BACKGROUND OF THE INVENTION

This invention is an improvement of the subject matter in my copending U.S. application Ser. No. 55,416 filed July 16, 1970, wherein the light fixture assembly of the tower was lowered by raising the counterweight within the tubular standard and substantially to the top thereof. As a result the counterweight was required to be relatively long so as to be of reasonable transverse dimensions facilitating movement of the counterweight along and within the narrow upper portion of the tubular tower. Also, in order to accommodate the counterweight at the bottom of the tower and permit lowering of the light fixture assembly substantially all the way to ground level for easy servicing, a well within the base of the tower structure was required to receive the counterweight and store a substantial portion of the counterweight below ground level.

BRIEF SUMMARY OF THE INVENTION

The tower has the light fixture assembly supported on cables for easy lowering to the ground, and the cables are attached to the counterweight for holding the light fixture assembly in place. However, the support cables are detachable from the counterweight which is maintained substantially at ground level; the connection between the support cables and the counterweight being provided by a removable winch drum and winch cable which may be operated to first lower the counterweight to set upon the base and supported thereby instead of being suspended from the support cables, and then to allow the support cables to move upwardly within the tower while the light fixture assembly is lowered. The counterweight is normally suspended by the support cables within the tubular tower for holding the light fixture assembly in its uppermost position at the top of the tower.

BRIEF DESCRIPTION OF DRAWINGS

Fig. 1 is an elevation view, partly broken away, of the tower structure and showing the light fixture assembly partially lowered in dotted lines.

Fig. 2 is a diagrammatic sketch of the apparatus at the top of the tower.

FIG. 3 is a vertical sectional view through the tower and showing the counterweight suspended by the support cables, and the winch apparatus applicable to the counterweight.

Fig. 4 is an enlarged detail elevation view showing the winch apparatus inserted between and connected to the counterweight and support cables, and in an intermediate stage prior to lowering the light fixture assembly.

FIG. 5 is a section view through the lower portion of the tower and showing the counterweight, winch apparatus and support cables during the operation of lowering the light fixture assembly.

DETAILED DESCRIPTION OF THE INVENTION

One form of the present invention is shown in the drawings and is described herein.

The tower is indicated in general by numeral **10** and includes a tubular standard **11** made from sheet steel, and in the form illustrated, is multi-sided and round or elliptical in configuration. The tower may have a height of up to **180** feet or more for the purpose of carrying light fixtures **12** which may illuminate highway intersections, traffic cloverleaf interchanges and the like, or, instead of the fixtures being lights, they might be other types of electric fixtures. The fixtures **12** are supported on a frame **13** which is generally ring shaped so as to encompass the entire standard **11** of the tower at the top thereof and be adapted to move downwardly along the tower in encompassing relation therewith to the ground level G. The fixture frame **13** has the facility for carrying electrical conductors to supply power to the fixtures **12**.

Rigid arms **14** project transversely outwardly from the top of the tower in multiple directions, and sheaves **15** and **16** are carried on the tower and arms **14** to carry the support cables **17**, each of which extends outwardly through a respective arm **14** for connection to the adjacent portion of the fixture frame by a suitable fitting **18**. An electrical cable **19** is also suspended over a sheave **20** mounted at the top of the tower, and one end is connected into the fixture frame **13** for supplying power to the fixtures **12**, while the other end of the electric cable **19** is suspended downwardly through the tower standard **11** to the ground.

The lower ends of support cables **17** are affixed to an anchor **21**, and the lower end of the electrical cable **19** is also affixed to the anchor **21**, and to an electrical connector **22** carried by the anchor **21**. Normally a supply cable with a plug **24** is plugged into the connector **22** for the purpose of supplying electrical power through the cable **19** and to the fixtures **12**. The cable **23** is connected to a suitable source of power and control apparatus, not shown.

A large counterweight **25** is confined within the tubular standard **11** approximately at ground level, and is normally suspended from the support cables **17** as illustrated in Figure 3. The counterweight **25** is normally secured to the support cables **17** by means of connectors **26** which take the form of short lengths of heavy cable. Rigid brackets **27** are provided on the counterweight **25**, and the connectors **26** are secured to the brackets **27**.

The connectors **26** are detachably secured by fittings **28** to a depending flange or lip **21a** which is a part of the anchor **21**.

The counterweight **25** is also connectible, and at certain times connected to the cables **17** by means of a winch **29** and a winch cable **30**. The top plate of the counterweight **25** has a pair of guideways **31** affixed thereto for receiving the base plate **32** of the winch **29**. The winch is thereby detachably connectible to the counterweight **25**. The winch also has a cable drum or spool **33** upon which the winch cable **30** is wound. A gear box **34** supplies power to the shaft of the winch drum **33** so as to alternately pay out or wind in the winch cable **30**.

For purposes of supplying rotary power into the gear case, the gear case has a drive coupling **35** to which may be attached a source of rotary power **36** which, in the form shown, takes the form of a power unit for a heavy duty drill which may receive its power from the

power cable 23 after the plug 24 is detached from the socket 22.

The winch cable 30 is also detachably connected to the lip or flange 21a of the anchor 21 by means of a suitable fitting 37, so that the entire winch 29 and cable 30 may be physically removed from the tower 10.

In operation, the fixture frame 13 will normally be held upwardly, snugly against the bracket arms 14 as illustrated in FIG. 1, and the support cables 17 support the counterweight off the base of the tower, substantially as illustrated in Figure 3 so that the weight of the counterweight is carried by the cables 17, and the weight of the counterweight is more than enough to hold the fixture 12 and frame 13 upwardly against the bracket arms 14. Electrical power is supplied through the electrical cable 23, the plug 24 and the socket 21 to the electrical cable 19 which supplies power to the fixtures 12.

When it is desired to perform some service, such as cleaning, or replacement of lighting apparatus, the fixture frame 13 and fixtures 12 will be lowered, substantially as illustrated in dotted lines in FIG. 1, and then downwardly almost to the ground G. In order to accomplish this lowering, the winch 29 is inserted through the access port 11 *a* of the tower and is attached to the counterweight by sliding the base plate 32 into the guideways 31 as illustrated in Figure 4. The winch cable 30 is then attached to the anchor 21 as illustrated in FIG. 4, and then the source of power 36 is coupled to the winch 29 as illustrated in FIG. 5. The winch is then operated to draw the winch cable downwardly as illustrated in FIG. 4 so as to take the entire strain of the connection between the cables 17 and the counterweight 25, and also so as to relieve the strain from the connectors 26. The connectors 26 are detached from the anchor 21 as illustrated in Figure 5, and then the winch cable 30 is payed out from the winch drum 33. This has the effect of first lowering the counterweight to rest upon the base of the tower as illustrated in Figure 5, and when the counterweight 25 has come to rest on the base, additional paying out of the winch cable 30 produces lowering of the fixture frame 13 as the support cables 17 and the anchor 21 travel upwardly within the tower. Of course, it is necessary to detach the electrical cable 23 from the socket 22 as this lowering operation is commenced.

The fixture frame 13 may be lowered until the anchor 21 moves upwardly throughout substantially the entire length of the tower, and until the anchor 21 is closely adjacent the sheaves 15 at the top of the tower. At this time the fixture frame 13 and fixtures 12 will be very nearly ground level so that they can be readily and easily serviced by workmen at ground level.

The fixture frame may thereafter by raised again, simply by winding the winch cable 30 onto the winch drum 33 until the fixture frame 13 bears upwardly against the bracket arms 14, and after the fixture frame is in place, the winch cable is wound onto the winch drum 33 slightly more so as to raise the counterweight 25, approximately to the position illustrated in FIG. 3 so that the counterweight is suspended by the support cables 17 and serves to hold the fixture frame 13 upwardly against the bracket arms 14.

After the connectors 26 are reattached to the anchor 21, the winch cable 30 is payed out slightly so as to transfer the strain of the connection between the anchor 21 and the counterweight 25 to the connectors 26. The winch cable 30 may thereafter be detached from the flange 21*a* of the anchor 21 and the winch 29 may be bodily removed from the counterweight and from the tower. Of course, it is necessary to reattach the electrical cable 23 by applying the plug 24 to the socket 22 for supplying electrical power to the fixtures 12.

It will be seen that I have provided a new and improved counterweight extension apparatus to facilitate holding the fixture frame upwardly against the bracket arms by the weight of the counterweight, but the counterweight need not travel upwardly in the tower in order to lower the fixture frame and fixtures to ground level. In order to accomplish lowering, a winch is attached between the counterweight and the support cables to first lower the counterweight to a position of rest on the base and then allow the support cables to move upwardly in the tower and thereby lower the fixture frame and fixtures to ground level for servicing.

What is claimed is:

1. Apparatus supporting electric fixtures at elevated locations,
   comprising a tower having stationary bracket means and cable sheaves mounted thereon at an elevated position,
   a fixture frame adjacent the bracket means for supporting such electric fixtures,
   a counterweight for the fixture frame,
   and means suspending the fixture frame and the counterweight and including cable means over the sheaves and winch means to pay out and retract the cable means to lower and raise the fixture frame and the counterweight, the fixture frame being normally tightly held against the bracket means, and the cable means being payed out from the winch means to first lower the counterweight to be supported independently of the cable means and to then lower the fixture frame.

2. The fixture supporting apparatus according to claim 1 and a rest for the counterweight and disposed therebeneath, said winch means being disposed between the counterweight and the cable means and being connected to the counterweight to pay out the cable for first lowering the counterweight to be supported upon said rest and then lowering the electric fixture cable.

3. The apparatus according to claim 2 and a detachable connector between the counterweight and the cable means to replace the winch means when the counterweight is normally suspended by the cable means.

4. The apparatus according to claim 3 and the cable means including a support cable and a winch cable releasably connected to each other,
   and the counterweight being suspended in closely spaced relation above said rest to which the counterweight may be lowered.

5. The apparatus according to claim 3 and a mount detachably connecting the winch to the counterweight.

6. Apparatus supporting electric fixtures at elevated locations,
   comprising a tower having transverse arms projecting from the top,
   cable carrying sheaves on the tower and arms,

a fixture frame encompassing the tower and being located below said arms to be normally retained against the arms,

a supporting cable over the sheaves and suspending the fixture frame,

a counterweight at the bottom of the tower and also suspended on the support cables to normally draw the fixture frame upwardly against the support arms,

a detachable connector between the counterweight and the support cable,

a winch and winch cable releasably connectible to the support cable,

and a detachable mount between the winch and the counterweight to alternate with said connector in carrying the strain between the support cable and the counterweight to permit lowering the counterweight to the base of the tower and subsequently paying out additional cable for lowering the fixture frame.

7. The apparatus according to claim 6 and said winch having a base plate,

and guideways on the counterweight to removably receive the base plate of the winch.

8. The apparatus according to claim 7 and said tower being tubular and confining the cable and counterweight therein, said tubular tower having an access port adjacent the guideways on the counterweight.

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