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Hodge, Jr.

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[54] **MOUNTING ARRANGEMENT FOR A LAMP**

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[52] **U.S. Cl.** ..... **339/52 S**; 240/51.11 R; 339/54; 339/55; 339/57

[51] **Int. Cl.**[2] **H01R 33/08**; H01R 33/06; H01R 33/10; H05B 33/02

[58] **Field of Search** ..... 339/50, 52, 54–57; 240/51.11, 153 F

[56] **References Cited**

UNITED STATES PATENTS

2,323,073	6/1943	Netting	339/52 R

FOREIGN PATENTS OR APPLICATIONS

958,330	5/1964	United Kingdom	240/51.11 R
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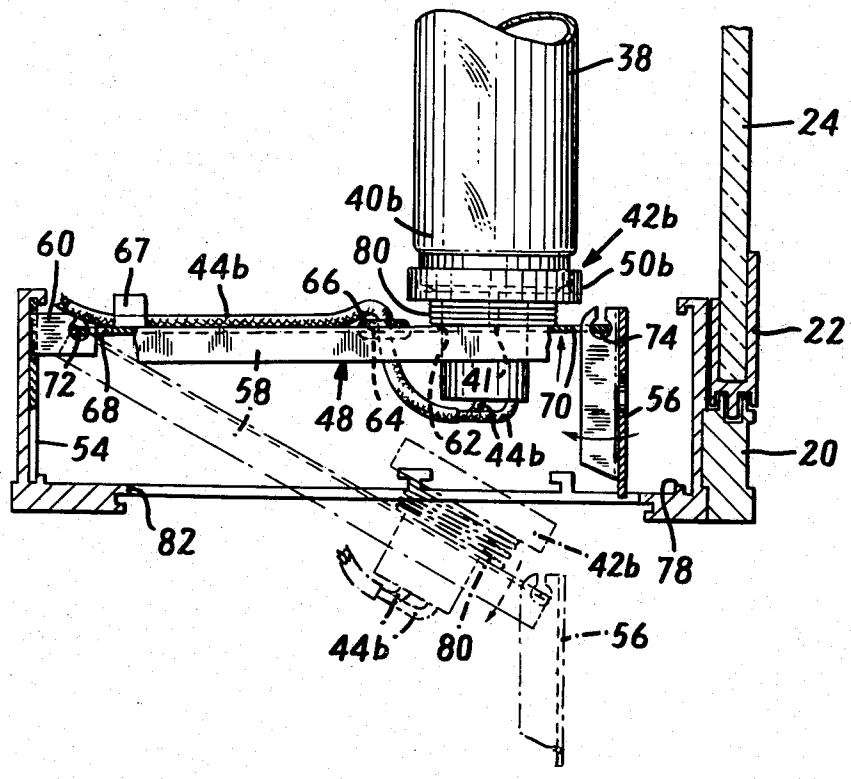
R. A. Berlier, "Lamp Socket," Feb. 1967, p. 1077, IBM Technical Disclosure Bulletin, Vol. 9, No. 9.

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Assistant Examiner—Craig R. Feinberg
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[57] **ABSTRACT**

A mounting arrangement for a cylindrical lamp, such as a fluorescent lamp, comprises a pair of spaced apart sockets for engaging opposite ends of the lamp so that an electrical connection is made with the lamp. At least one of the sockets is movable toward and away from the other socket and is mounted in a bracket, at least a portion of which is also movable toward and away from the other socket. A spring provides a biasing action axially of the lamp to maintain a secure engagement of the lamp by the sockets. When the lamp is disposed between the sockets so as to be engaged thereby, movement of the movable portion of the bracket toward the other socket and into a predetermined locking position tends to compress the spring so as to maintain engagement of the lamp by the sockets. Movement of the movable portion of the bracket away from the other socket and away from the predetermined locking position, when the lamp is engaged by the sockets, tends to release compression on the spring and permits movement of the movable socket away from the other socket. The lamp can then be disengaged from the sockets and axially displaced from between the sockets.

6 Claims, 3 Drawing Figures



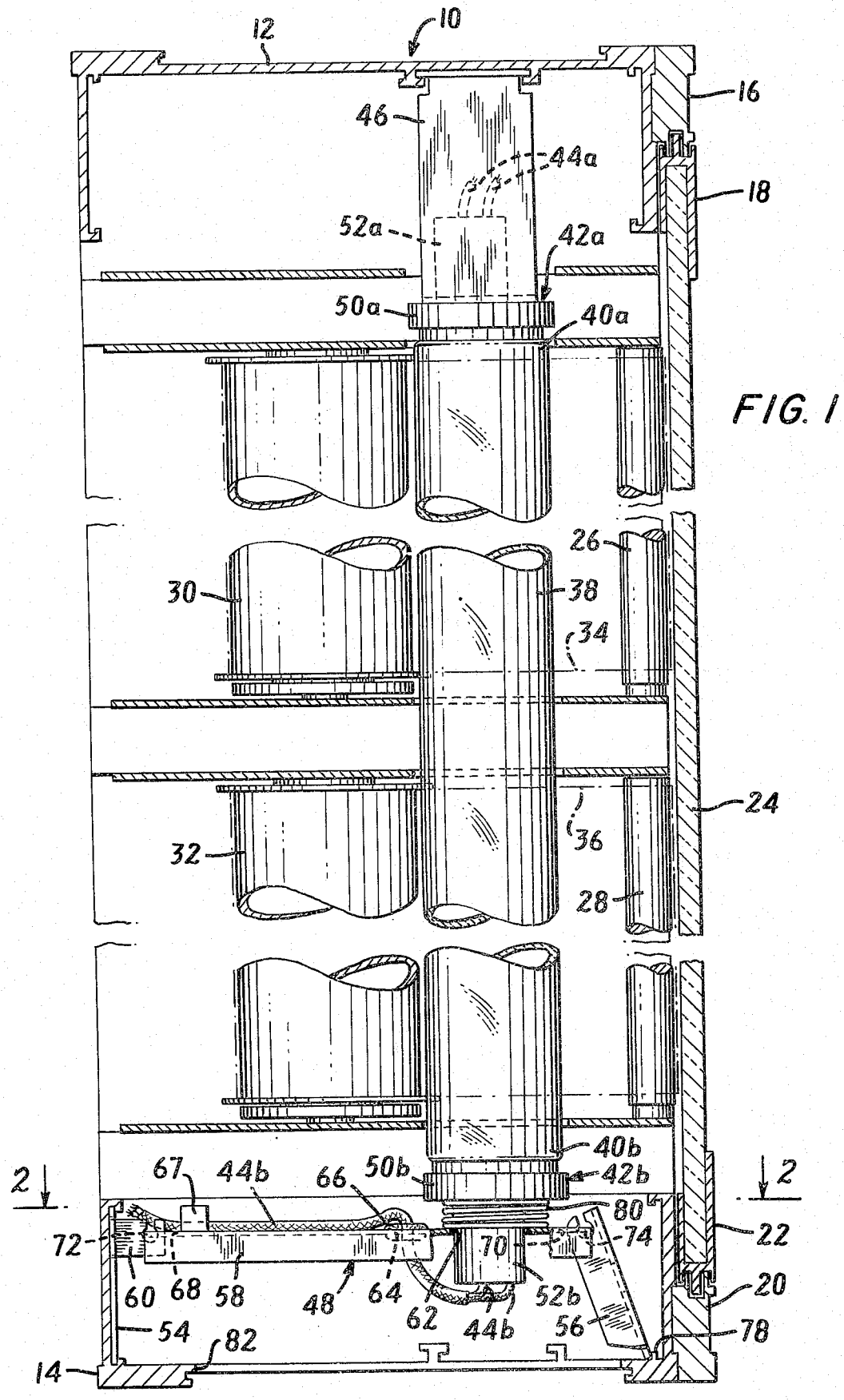

12
10
16
46
44a
18
52a
42a
50a
40a
26
30
38
34
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36
32
28
40b
42b
2
67
44b
66
50b
2
80
72
74
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48
64
52b
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62
44b
56
54
82
78
14

FIG. 1

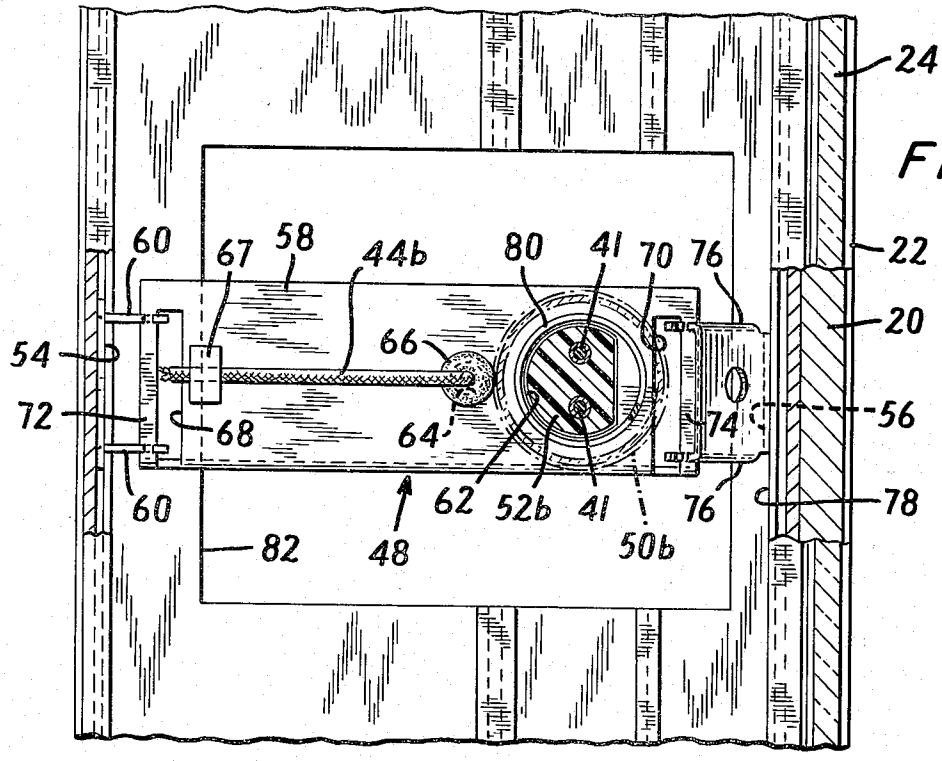
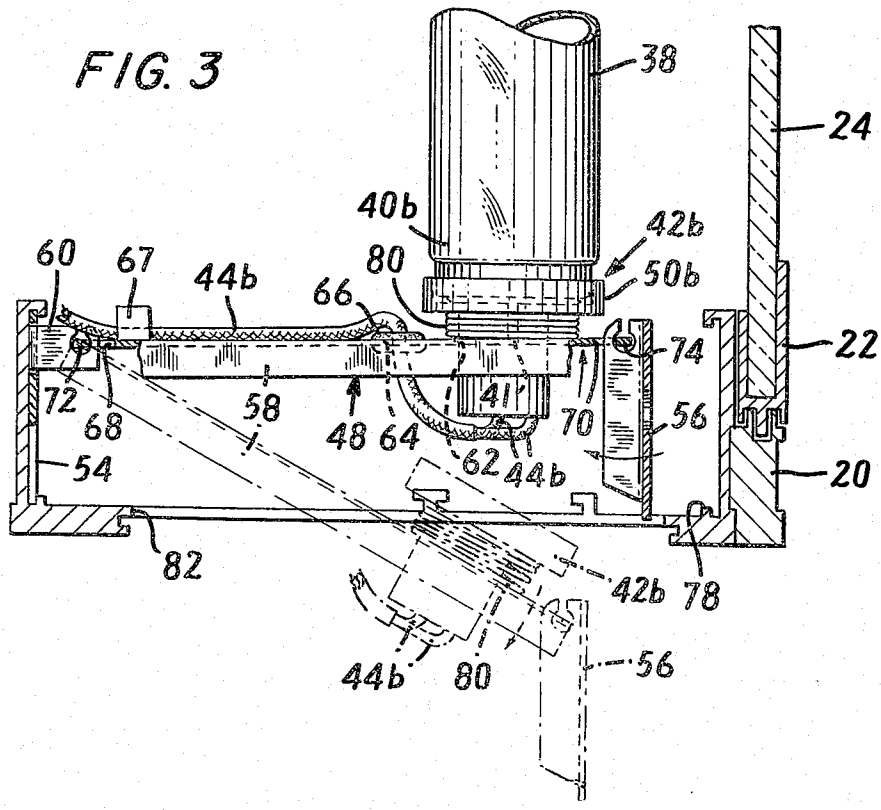

24
22
20
56
78
60
67
58
44b
80
41
70
76
66
54
72
68
64
74
62
52b
41
76
60
82
48
50b

FIG. 2

FIG. 3


38
24
40b
42b
50b
60
67
44b
80
66
74
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72
68
58
48
64
41
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62
44b
20
82
42b
78
44b
80
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MOUNTING ARRANGEMENT FOR A LAMP

BACKGROUND OF THE INVENTION

A tubular or cylindrical fluorescent lamp is commonly mounted in a fixture that includes spaced apart and opposing sockets to receive the contact pins on the ends of the lamp and provide the necessary electrical connection between the lamp and a source of electricity. The lamp fixture is generally mounted on a wall or the ceiling of a room so that the lamp held by the fixture lies in a generally horizontal plane. To permit convenient installation and replacement of a lamp, therefore, it is desirable, if not necessary, to be able to mount the lamp in the fixture by first inserting one end of the lamp into a corresponding socket and then moving the other end of the lamp essentially laterally into position to engage the facing socket.

Typically, the sockets of a fixture for a fluorescent lamp are fixed in place. The ends of a lamp are inserted into slots in the sockets and are held in place by reason of offsets in the slots or by rotation of the lamp a part of a turn so that the contact pins on the ends of the lamp rest on the walls of the slots so as to prevent the pins from accidentally falling out of the sockets. Such a fixture is described and illustrated in Beals U.S. Pat. No. 2,424,874.

In another type of lamp fixture, one of the lamp sockets is elongated and has a spring loaded contact plate mounted in it. To install a lamp in the fixture, one end of the lamp is inserted into the elongated socket until the spring is fully compressed. Sufficient clearance then remains for the other end of the lamp to be moved laterally into alignment with the other socket. The biasing action of the spring is utilized to seat the other end of the lamp into the corresponding socket and to maintain the lamp securely between the two sockets. Fixtures using elongated sockets and spring biasing apparatus are illustrated in Mueller U.S. Pat. No. 2,427,225 and in FIGS. 10–16 of Netting U.S. Pat. No. 2,323,073.

In a third type of lamp fixture, one of the sockets is mounted for limited movement toward and away from the other socket. The increased spacing between the sockets achieved by moving the movable socket away from the other socket affords the necessary clearance for inserting a lamp laterally into position between the sockets. When the movable socket is moved back into its locking position, the lamp is held securely between the sockets. Fixtures of the third type are illustrated and described in Dansereau U.S. Pat. No. 2,403,968 and Summers U.S. Pat. No. 2,228,646.

Since it is commonly more convenient to afford lateral access to a lamp mounted in a fixture, the fixtures described in the patents noted above are not constructed for replacement or installation of a fluorescent lamp by longitudinal or axial movement of the lamp relative to fixtures. The sole exception is the fixture illustrated in FIGS. 1–9 of the Netting patent, in which one of the sockets is pivotable away from the corresponding end of a lamp so as to permit axial removal of the lamp from the fixture. The fixture of FIGS. 1–9 of the Netting patent must be swung out of a casing recessed in a wall or ceiling, however, in order to accommodate movement of its movable socket away from the corresponding end of a lamp, as shown in FIG. 6 of the Netting patent.

One disadvantage of the prior art fixtures requiring lateral access is that they can not be conveniently adapted for use in an outdoor illuminated sign, for example. Such an illuminated sign has at least one translucent or transparent sign face with a design or message arranged thereon. The face is illuminated by tubular fluorescent lamps oriented vertically or horizontally behind the sign face. In order to use a conventional lamp fixture, therefore, the sign face, or a corresponding blank rear panel, must be hinged for outward pivotal movement in the manner of the Netting light fixture.

While it may be possible to use a hinged front face or rear panel in some situations, the convenience of conventional fixtures is substantially reduced in a sign that has a considerable surface area or is elevated on posts a considerable distance above the ground. Then the individual responsible for maintaining the sign must have a ladder to replace or install fluorescent lamps or perhaps even a truck mounted, vertically movable platform mounted on a boom, such as the device commonly referred to as a "cherry picker."

Illuminated signs also often include apparatus other than the sign face which would also have to be hinged for movement away from the fluorescent sign lamps if conventional mounting fixtures are used. For example, an illuminated sign may include a frame with a transparent sign face and a plurality of translucent, flexible webs or tapes mounted immediately behind the transparent face on rotatable rolls. Each web has a plurality of different messages printed on it or, perhaps, simply a plurality of different letters. When the message on the sign is to be changed, the flexible webs are rolled and unrolled so that the portions of the webs visible through the transparent face are changed. In such a sign, the fluorescent lamps are mounted behind both the transparent sign face and the translucent flexible webs. Thus, considerable complicated apparatus including the take-up rolls for the webs and possibly the mechanism for rotating the rolls would have to be movable out of the way to permit lamp installation and replacement in conventional fixtures.

SUMMARY OF THE INVENTION

The present invention is directed to a mounting arrangement for a cylindrical or tubular lamp, such as a fluorescent lamp, which permits the lamp to be installed and replaced by essentially axial or longitudinal movement of the lamp into and out of the mounting arrangement. The mounting arrangement of the invention comprises a pair of spaced apart sockets for engaging opposite ends of a cylindrical lamp so that an electrical connection is made with the lamp. At least one of the sockets is movable. toward and away from the other socket and is mounted on a bracket. At least a portion of the bracket is also movable toward and away from the other socket. A spring provides a biasing action axially of the lamp to maintain a secure engagement of the lamp with the sockets. When the lamp is disposed between the sockets so as to be engaged thereby, movement of the movable portion of the bracket toward the other socket and into a predetermined locking position tends to compress the spring so as to maintain engagement of the lamp by the sockets. Movement of the movable bracket portion away from the other socket and away from the predetermined locking position, when the lamp is engaged by the sock-

ets, tends to release compression of the spring and permits movement of the movable socket away from the other socket. The lamp can then be disengaged from the sockets and axially displaced from between the sockets.

In a preferred embodiment of the invention, the spring is disposed between the movable portion of the bracket and a portion of the movable socket so that compression of the spring is achieved by relative movement between the movable bracket portion and the portion of the socket. The bracket includes two bracket elements, one of which engages the movable socket and is mounted for pivotal movement about one end toward and away from the other socket. The second bracket element is pivotably coupled at one end to the other end of the first bracket element. A detent is provided to engage the free end of the second bracket element and thereby prevent pivotal movement of the second bracket element. When the second bracket element engages the detent, pivotal movement of the first bracket element away from the other socket and away from the predetermined locking position is also prevented. The movable socket may be located below the other socket so that the lamp when installed in the sockets assumes a generally vertical orientation.

As can be seen from the above description, the present invention provides a convenient mounting arrangement for fluorescent or other tubular or cylindrical lamps that must be mounted in a restricted space, without requiring lateral access to the lamps. The mounting arrangement is particularly suited for use in outdoor illuminated signs since a fluorescent lamp can be installed or replaced through a relatively small access opening in a bottom or side edge of the sign, instead of having a hinged or otherwise movable sign face to permit access to the fluorescent lamp fixture.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the invention, reference made be made to the following description of an exemplary embodiment, taken in conjunction with the figures of the accompanying drawings, in which:

FIG. **1** is a side sectional view of an illuminated sign equipped with a fluorescent lamp mounting arrangement according to the invention;

FIG. **2** is a sectional view taken along view line **2—2** of FIG. **1**; and

FIG. **3** is a view of a part of FIG. **1** showing the mounting arrangement of the invention in two different positions during the removal of a fluorescent lamp from the sign.

DESCRIPTION OF AN EMBODIMENT

FIG. **1** of the drawings is a longitudinally interrupted sectional view of an illuminated sign **10** equipped with fluorescent lamp mounting arrangements according to the present invention. While only one mounting arrangement is illustrated, the sign **10** includes a plurality of such mounting arrangements spaced across its width. A frame fabricated of extruded aluminum sections, for example, extends along the top, bottom and side edges of the sign **10.** Two similar aluminum extrusions **12** and **14** define the top and bottom, respectively, of the sign frame. Along corresponding front edges of extrusions **12** and **14** are similar pairs of extruded frame members **16** and **18,** and **20** and **22,** respectively. The frame members **18** and **22** are both configured to provide channels that receive the upper and lower edges of a transparent sign face **24.**

Immediately behind the sign face **24** are two rows of rollers **26** and **28.** The rollers **26** are positioned above the rollers **28** and only one roller of each row is illustrated in FIG. **1.** The rollers **26** and **28** are vertically oriented and within each row, the rollers are arranged in pairs. Behind the rows of rollers **26** and **28** are corresponding rows of vertically oriented winding spools **30** and **32.** Within the rows of winding spools **30** and **32,** the spools are arranged in pairs corresponding to the pairs of rollers **26** and **28.** Each grouping of a pair of winding spools **30** or **32** and a pair of rollers **26** or **28** mounts and displays a flexible web or tape **34** or **36** of translucent material. For example, two winding spools **30** hold opposite ends of a translucent tape **34** and store excess tape not currently being displayed. The portion of the tape **34** which is being displayed extends between a corresponding pair of rollers **26** so as to be located immediately behind the transparent sign face **24.** When the portion of the translucent tape **34** displayed behind the sign face **24** is to be changed, the tape is unwound from one winding spool **30** and wound up on the other winding spool **30** of the spool pair by any appropriate mechanism (not shown) until the desired portion of the tape **34** is disposed between the corresponding pair of rollers **26.** In the sign illustrated in FIG. **1,** each translucent tape **34** or **36** has printed on it each of the letters of the alphabet, numerals from zero to nine and additional characters such as a period, a comma, a dash and other punctuation marks. Each grouping of two winding spools and two rollers occupies one letter position on the sign **10** so that a series of letters and words can be displayed on the sign, depending upon the number of winding spool and roller groupings included in the sign.

Centrally located in each grouping of two winding spools **30** and two rollers **26** and extending the height of the sign **10** through a vertically aligned grouping of two winding spools **32** and two rollers **28** is a cylindrical fluorescent lamp **38.** Being so located, the lamp **38** can illuminate the portions of the tapes **34** and **36** currently displayed. At its upper and lower ends **40***a* and **40***b*, the lamp **38** has pair of protruding pins **41** (shown in FIGS. **2** and **3**) that engage and make electrical connections with sockets **42***a* and **42***b*. Each socket **42***a*, **42***b* has a flange portion **50***a*, **50***b* at one end and a shank portion **52***a*, **52***b*, extending from the flange portion. Electrical wires **44***a*, **44***b* extend from the base of the shank portion **52***a*, **52***b* and are connected into an appropriate electrical circuit (not shown). The sockets **42***a* and **42***b* are generally cylindrical in shape, but one edge of each of the shank portions **52***a* and **52***b* is flattened, as best shown in FIG. **2.**

The upper socket **42***a* for the fluorescent lamp **38** is mounted in a bracket **46** carried in grooves formed in the top frame member **12.** The lower socket **42***b* is mounted in a bracket **48** supported on the bottom frame member **14.** As illustrated in FIGS. **1** and **2** of the drawings, the shank portion **52***b* of the socket **42***b* is received in an opening that is formed in the bracket **48** and has a corresponding generally circular configuration with a flattened edge. Thus, when the socket **42***b* is seated in the bracket **48,** relative rotation of the socket in the bracket is prevented. The bracket **46** has a similarly shaped opening to receive the shank **52***a* of the socket **42***a* and to prevent rotation of the socket in the bracket.

The bracket **48** includes end bracket elements **54** and **56** and a center bracket element **58** that is pivotally connected at one end to the bracket element **54** and at its other end to the bracket element **56.** The end bracket element **54** is a generally square aluminum member with a pair of protruding lugs **60** stamped from its face and extending from one side of the element **54.** Each lug **60** has an upwardly opening recess and the recesses in the lugs **60** receive a portion of the central bracket element **58,** as will be described hereinafter. The end bracket element **56** is also a generally square aluminum member with a pair of flanges **76** formed by bending opposite side edges outwardly from the main body of the element. Upwardly opening recesses in the flanges **76,** like the recesses in the lugs **60,** receive a portion of the central bracket element **58.**

As best shown in FIG. **2,** the central bracket element **58** is a rectangular aluminum stamping having a large opening **62** to receive the lower socket **42***b* and an adjacent smaller opening **64** through which extend the electrical wires **44***b*. A plastic grommet **66** protects the wires **44***b* from being cut by the edges of the opening **64.** A plastic retainer **67** is glued to the top of the bracket element **58** to hold the wires **44***b*, which extend lengthwise of the element, in place on the element. Laterally extending slots **68** and **70** are formed adjacent the ends of the bracket element **58** and are positioned to define pivot bars **72** and **74,** respectively, at the ends of the element. The pivot bar **72** is received in the recesses in the lugs **60** of the end bracket element **54,** while the pivot bar **74** is received in the recesses in the flanges **76** of the end bracket element **56.** As a result, the bracket elements **54** and **58** pivot about the bar **72,** while the bracket elements **58** and **56** pivot about the bar **74.**

When the bracket **48** is installed in the sign **10** and mounts a lamp **38,** the end bracket element **54** is slidably received in a pair of slots formed in the frame member **14** so as to support one end of the central bracket element **58.** The other end of the bracket element **58** is supported by the end bracket element **56** which rests on a horizontal surface of the frame member **14** so as to form an obtuse angle with the central bracket element. The end bracket element **56** is held against outward pivotal movement by a detent or stop **78** formed on the frame member **14.** As described, the bracket **48** is in its locking position and supports the fluorescent lamp **38** in the socket **42***b*. A coil spring **80** that encircles the shank portion **52***b* of the socket **42***b* is partly compressed between the flange portion **50***b* of the socket and the central bracket element **58.** The biasing force exerted by the compressed spring **80** helps to maintain the fluorescent lamp **38** securely engaged with the sockets **42***a* and **42***b*.

When it is desired to replace the fluorescent lamp **38,** because it has burned out, for example, access to the lamp is gained through an opening **82** formed immediately below the lamp in the lower frame member **14.** The opening **82** may remain open at all times or it may be closed by a cover plate (not shown) that slides along in grooves formed in the frame member **14.** As shown in FIG. **3** of the drawings, removal of the lamp **38** begins by moving the central bracket element **58** upwardly to compress the spring **80** fully against the flange **50***b* of the lower socket **42***b*. The upward movement of the central bracket element **58** is sufficient to permit the end bracket element **56** to be pivoted in a clockwise direction out of engagement with the detent **78,** as shown in full in FIG. **3.** With the end bracket member **56** clear of the edge of the access opening **82,** the central and end bracket elements **58** and **56** can be pivoted downwardly through the access opening, as shown in phantom in FIG. **3.** The downward movement of the bracket element **58** releases the compression on the spring **80** and permits the contact pins **41** on the end **40***b* of the lamp **38** to be unplugged from the socket **42***b*. Since the bracket **48** is pivoted completely out of the way of the end **40***b* of the lamp **38,** the lamp can be removed from the sign **10** by simple longitudinal or axial movement through the opening **82.**

The embodiment of the invention described above is an inexpensive and convenient mounting arrangement for a fluorescent lamp and permits installation and removal of a lamp with a minimum of access being provided. In addition, no movement of a lamp is required, when being removed from the mounting arrangement, until the lamp is free to be displaced from the mounting arrangement in an essentially continuous axial movement. The use of metal stampings for the bracket elements **54, 56** and **58** is advantageous since such stampings are inexpensive and convenient to manufacture and can be quickly assembled. Nonetheless, the bracket elements **54–58** can be fabricated in any other convenient manner and can be coupled together more permanently by hinge pins or elongated pop rivets.

It will be understood that the above described embodiment is merely exemplary and that persons skilled in the art may make many variations and modifications without departing from the spirit and scope of the invention. All such modifications and variations are intended to be within the scope of the invention as defined in the appended claims.

I claim:

1. A mounting arrangement for a cylindrical lamp comprising:

a. a pair of spaced apart sockets for engaging opposite ends of the lamp so that an electrical connection is made with the lamp, at least one of the sockets being movable toward and away from the other socket;

b. bracket means for mounting the one socket including a first bracket element engaging the one socket and mounted for pivotal movement about one end toward and away from the other socket and a second bracket element pivotally coupled at one end to the other end of the first bracket element;

c. spring means adapted to provide a biasing action axially of the lamp to maintain a secure engagement of the lamp by the sockets, wherein movement of the first bracket element toward the other socket and into a predetermined locking position, when the lamp is disposed between the sockets so as to be engaged thereby, tends to compress the spring means so that secure engagement of the lamp with the sockets will be maintained by the biasing action of the spring means, and movement of the first bracket element away from the other socket and away from the predetermined locking position, when the lamp is engaged by the sockets, tends to release compression of the spring means and permits movement of the one socket away from the other socket so that the lamp can be disengaged from the sockets and axially displaced from between the sockets; and

d. detent means engageable with the other end of the second bracket element, engagement of the detent means with the second bracket element preventing pivotal movement of the second bracket element, thereby maintaining the first bracket element in its predetermined locking position and preventing pivotal movement of the first bracket element about its one end away from the other socket and away from the predetermined locking position.

2. A mounting arrangement according to claim **1**, wherein the spring means is disposed between the first bracket element and at least a portion of the one socket so that compression of the spring means is achieved by relative movement between the first bracket element and the portion of the socket.

3. A mounting arrangement according to claim **1**, wherein the one socket is located below the other socket and the lamp when engaged by the sockets assumes a generally vertical orientation.

4. In a sign having a frame for supporting a sign face and a sign face that permits light to pass therethrough and that is adapted for illumination by at least one cylindrical lamp disposed in the sign behind the face, the improvement of a mounting arrangement for a cylindrical lamp comprising:

a. a pair of spaced apart sockets for engaging opposite ends of the lamp so that an electrical connection is made with the lamp, one of the sockets being located below the other socket and being movable vertically toward and away from the other socket;

b. bracket means mounting the one socket, and including:

i. a first bracket element engaging the one socket and mounted for pivotal movement about one end toward and away from the other socket, and

ii. a second bracket element pivotally coupled at one end to the other end of the first bracket element;

c. spring means disposed between the first bracket element and a portion of the one socket; and

d. detent means formed on the sign frame and engageable with the other end of the second bracket element, so as to prevent pivotal movement of the second bracket element, thereby to maintain the first bracket element in a predetermined locking position and to prevent pivotal movement of the first bracket element about its one end away from both the other socket and the predetermined locking position;

pivotal movement of the first bracket element toward the other socket and into the predetermined locking position, when the lamp is disposed between the sockets so as to be engaged thereby, tending to compress the spring means so that the spring means will bias the one socket away from the first bracket element and toward the other socket to maintain a secure engagement of the lamp with the sockets when the first bracket element is in its predetermined locking position, and

pivotal movement of the first bracket element away from the other socket and away from the predetermined locking position, when the lamp is engaged by the sockets, tending to release compression of the spring means and permitting movement of the one socket away from the other socket so that the lamp can be disengaged from the sockets and axially displaced from between the sockets.

5. The improvement of claim **4**, wherein the bracket means also includes a third bracket element mounted on the sign frame and pivotally coupled to the one end of the first bracket element so as to permit pivotal movement of the first bracket element.

6. The improvement of claim **4**, wherein an opening is formed in the sign frame to permit access to the mounting arrangement and to facilitate insertion of a lamp into the mounting arrangement.

* * * * *