

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
6 May 2010 (06.05.2010)

(10) International Publication Number  
**WO 2010/051081 A1**

(51) International Patent Classification:  
F16C 11/00 (2006.01)

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(21) International Application Number:  
PCT/US2009/049891

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(22) International Filing Date:  
8 July 2009 (08.07.2009)

(81) Designated States (unless otherwise indicated, for every  
kind of national protection available): AE, AG, AL, AM,  
AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ,  
CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO,  
DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,  
HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP,  
KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD,  
ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI,  
NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD,  
SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT,  
TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
12/262,932 31 October 2008 (31.10.2008) US

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(84) Designated States (unless otherwise indicated, for every  
kind of regional protection available): ARIPO (BW, GH,  
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,  
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ,

[Continued on next page]

(54) Title: ARTICULATING JOINT FOR DENTAL OR MEDICAL LIGHTS

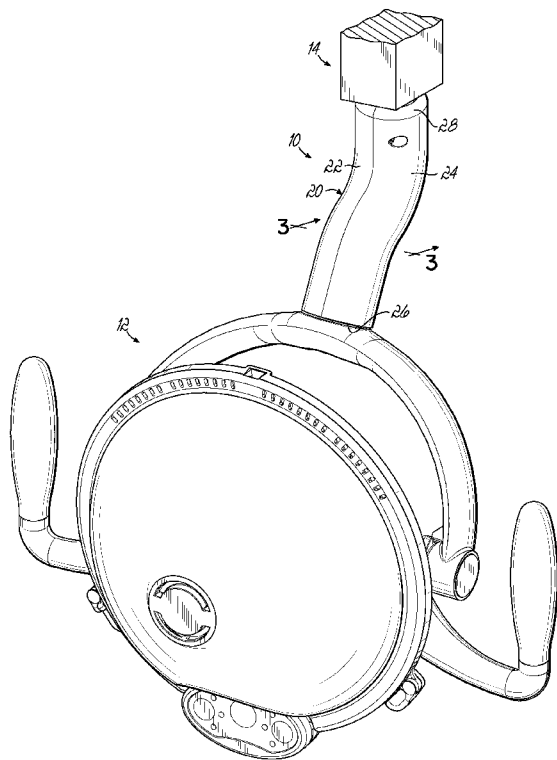


FIG. 1

(57) Abstract: An articulating joint (10) for supporting a medi-  
cal or dental light (12) having a first mounting post (36) rota-  
tably couples the light (12) to a support structure (14) having a  
second mounting post (38). The articulating joint (10) includes  
a joint body (22) having first and second terminal ends 26, (28).  
A first bearing (48) and a first brake (54) are located proximate  
the first end (26) for receiving and frictionally engaging the first  
mounting post (36). The joint body (22) may further include a  
second bearing (50) and a second brake (56) proximate the sec-  
ond end (28) for receiving and frictionally engaging the second  
mounting post (38). The articulating joint (10) further includes a  
cover (24) that is removably coupled to the joint body (22) over  
at least the first bearing (48) and the first brake (54).

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TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG). **Published:** — *with international search report (Art. 21(3))*

## ARTICULATING JOINT FOR DENTAL OR MEDICAL LIGHTS

### Technical Field

**[0001]** This invention generally relates to support structure for dental or medical lights, and more specifically to an articulating joint for supporting dental or medical lights.

### Background

**[0002]** Conventional dental operatories generally include an articulating dental chair for supporting a patient in a variety of positions to facilitate the performance of dental procedures and operations. For example, dental chairs are generally adapted to be raised and lowered relative to a floor surface, and to be moved between a first orientation where a seat back is inclined relative to a seat base to support the patient in a seated position, and a second orientation where the seat back is reclined to support the patient in a generally supine position.

**[0003]** The dental operatory may also include a dental delivery unit adapted to support various instruments and tools used during the performance of dental procedures. The delivery unit is typically provided with water and pressurized air for operating the instruments, and may include a tray for supporting instruments or other articles used by the practitioner. The delivery unit may be supported on a movable arm that facilitates positioning the unit and instruments adjacent the dental chair for convenient access by the practitioner during the performance of a procedure, then moved away to permit the patient to exit the dental chair when the procedure is complete.

**[0004]** Conventional dental operatories may further include a cuspidor provided adjacent the dental chair to permit patients to expel the contents of their mouths during or at the conclusion of the dental procedure, an adjustably positionable light to illuminate the treatment area, and various other devices useful for the performance of dental procedures. Such devices may be supported on cabinetry or other structure positioned adjacent the dental chair for convenient access by the patient or the dental practitioner.

**[0005]** Conventional adjustable position lights are typically coupled via an elbow joint to a support structure that extends over a patient. The elbow joint allows the light to rotate around the longitudinal axis of a post extending from the light

assembly. The elbow joint must be strong enough to support the weight of the light, and maneuverable to facilitate illumination of various locations on the patient's body. Further, the elbow joint needs to allow for easy manipulation of the light while also limiting rotational movement so that the light is held in a desired position. To accomplish these functions, conventional joints supporting lights have been fitted with an elongated bearing in the shape of a sleeve having a slit along its longitudinal axis. The elongated bearing is positioned between the inner surfaces of the elbow joint and the post extending from the light into the elbow joint. Pressure applied to the sleeve by an outer covering of the joint increases the frictional force applied to the post and restricts the rotation of the post in the joint. A known drawback with elbow joints having this construction is that the sleeve, typically made of brass, functioning as both a bearing and a brake, tends to wear out relatively quickly as the metal fatigues and the slit in the sleeve begins to spread. A further drawback is that the frictional force applied to the post is difficult to adjust, thereby making the maintenance of the elbow joint, and correspondingly the light, difficult and time consuming.

**[0006]** There is a need for articulating joints for supporting dental or medical lights that overcomes these and other drawbacks of prior joints.

### **Summary**

**[0007]** The present invention overcomes the foregoing and other shortcomings and drawbacks of joints heretofore known for supporting dental or medical lights. While the invention will be described in connection with certain embodiments, it will be understood that the invention is not limited to these embodiments. On the contrary, the invention includes all alternatives, modifications and equivalents as may be included within the spirit and scope of the present invention.

**[0008]** In one aspect, articulating joint for coupling a medical light having a first mounting post to a support structure having a second mounting post includes a joint body having first and second terminal ends. A first bearing having an inner surface is provided near the first end and is adapted to receive the first mounting post. A first brake is coupled to the joint body near the first bearing and is adjustably biased to frictionally engage the first mounting post when the first mounting post is received in

the first bearing. The articulating joint further includes a cover removably coupled to the joint body over at least the first bearing and the first brake.

**[0009]** In another aspect, the articulating joint may further include a second bearing and a second brake near the second end of the joint body. The second bearing has an inner surface and is adapted to receive the second mounting post along the inner surface. The articulating joint may further include a third bearing near the first end and spaced from the first bearing, and/or a fourth bearing near the second end and spaced from the second bearing. In yet another aspect, the first brake may be disposed between the first and third bearings, and the second brake may be disposed between the second and fourth bearings.

**[0010]** In another aspect, an illumination apparatus includes a medical light having a first mounting post and an articulating joint coupling the medical light to a support structure. The articulating joint comprises a joint body having first and second terminal ends. A first bearing having an inner surface is disposed proximate the first terminal end. The first mounting post is received in the bearing along its inner surface. A first brake is coupled to the joint body proximate the first bearing and is adjustably biased to frictionally engage the first post. A cover is removably coupled to the joint body over at least the first bearing and the first brake. The second terminal end of the joint body may be configured for coupling to a mounting post extending from a support structure.

**[0011]** These and other features, objects and advantages of the invention will become more readily apparent to those skilled in the art in view of the following detailed description, taken in conjunction with the accompanying drawings.

### **Brief Description of the Drawings**

**[0012]** In the accompanying drawings:

**[0013]** FIG. 1 is a perspective view of an exemplary articulating joint and medical light in accordance with the present disclosure.

**[0014]** FIG. 2 is an exploded perspective view of the articulating joint of FIG. 1.

**[0015]** FIG. 3 is a schematic cross-sectional view of the articulating joint taken along line 3-3 of FIG. 1.

**Detailed Description**

**[0016]** When introducing elements of the present invention (e.g., the exemplary embodiments(s) thereof), the articles "a", "an", "the" and "said" are intended to mean that there are one or more of the elements. The terms "comprising", "including" and "having" are intended to be inclusive and mean that there may be additional elements other than the listed elements.

**[0017]** FIGS. 1-3, depict an exemplary articulating joint 10 for use with a medical or dental light 12. The articulating joint 10 couples the medical or dental light 12 to a support structure 14, such as a support arm or track system (not shown). The articulating joint 10 allows the light 12 to rotate or pivot around the longitudinal axis of the articulating joint. The unique construction of the articulating joint 10 allows the medical or dental light 12 to rotate easily about the longitudinal axis of the joint 10, while also providing enough resistance to rotation to hold the light 12 stationary in a desired position once an applied force for moving the light is removed. The construction of the articulating joint 10 also allows for easy adjustment of the resistance to rotation and provides greater durability than articulating joints currently available.

**[0018]** As seen in FIGS. 1-3, the articulating joint 10 consists of a cover 24 and a joint body 22 having first and second terminal ends 26, 28. The first terminal end 26 has a first opening 32 and is configured for coupling to one of a medical light 12 or a support structure 14. The second terminal 28 end has a second opening 34 and is configured for coupling to the other of the medical light 12 or support structure 14. Specifically, at least one of the first or second terminal ends 26, 28 is configured for coupling to a mounting post 36, 38 coupled to and extending from the medical light 12 or support structure 14. Likewise, the other of the first or second terminal ends 26, 28 of articulating joint 10 is configured for coupling to the other of medical light 12 or support structure 14. The other of the first or second terminal ends 26, 28 may be configured for coupling to a mounting post 36, 38 coupled to and extending from the other of the medical light 12 or support structure 14, or may be coupled in some other manner, such as by a ball and socket joint, by a bracket, or various other coupling structure.

**[0019]** Joint body 22 is substantially hollow and is capable of withstanding the stresses associated with supporting and moving medical light 12. Joint body 22 has an inner portion 40 and an outer portion 42. The first and second openings 32, 34

found at the first and second terminal ends 26, 28 of joint body 22 allow fluid communication between the inner portion 40 and outer portion 42 of joint body 22.

**[0020]** In the embodiment shown, joint body 22 and cover 24 have a double arcuate shape along the length of the joint 10, as seen in FIGS. 1 and 2. In other embodiments, joint body 22 and cover 24 may have an arcuate or substantially linear shape. The double arcuate shape provides an advantage of increasing the range of motion for light 12. However, it is understood that the articulating joint may have any shape that is consistent with the use of positioning medical light 12.

**[0021]** Joint body 22 is constructed such that it is capable of withstanding the stresses associated with supporting and moving the medical light 12. Joint body 22 may comprise a thickened half sleeve, as seen in FIGS. 2 and 3, or frame, or other suitable structure. Joint body 22 may be made of any suitable material or combination of materials capable of withstanding the stresses associated with supporting the medical light 12, such as, without limitation, steel, aluminum, titanium, metal alloys, hardened plastics, composite materials, and combinations thereof. Joint body 22 may be manufactured using various techniques, such as without limitation forging, molding, shaping, and cutting.

**[0022]** Cover 24 primarily functions to shield the internal components of joint body 22, but may also provide structural support to articulating joint 10. Cover 24 may be made of any suitable material. In the embodiment shown, the cover 24 is coupled to the joint body 22 by screws 44. It will be appreciated, however, that cover 24 may be removably coupled to joint body 22 by any suitable method or structure, such as by bolts, clamps, latches, locks, lugs, nuts, pins, rivets, or screws, for example.

**[0023]** As mentioned above, at least one of the first or second terminal ends 26, 28 of joint body 22 is configured for coupling to a mounting post 36, 38 coupled to and extending from a medical light 12 or a support structure 14. The post-coupling terminal ends 26, 28 include the first and second openings 32, 34 of joint body 22 and extend into inner portion 40 of joint body 22. The post-coupling terminal ends 26, 28 each include at least one bearing 48, 50, 58, 60 and at least one brake 54, 56.

**[0024]** Bearings 48, 50, 58, 60 have openings 62 defining an inner surface 64 for receiving mounting posts. The bearings 48, 50, 58, 60 may optionally receive a

bearing sleeve 52, 66, 67, 69 disposed between the mounting post 36, 38 and the inner surface 64 of the bearings 48, 50, 58, 60.

**[0025]** Bearings 48, 50, 58, 60 support the weight of the medical or dental light 12 and are either an extension of joint body 22 or are anchored to joint body 22 by any suitable method, such as, without limitation, bolts, clamps, locks, lugs, nuts, pins, rivets, screws, welds, or adhesive. Bearings 48, 50, 58, 60 may be constructed of the same or different material as joint body 22, such as, without limitation, steel, aluminum, titanium, metal alloys, hardened plastics, composite materials, and combinations thereof.

**[0026]** In the embodiment shown, first bearing 48 is located near the first terminal end 26 of joint body 22 and is coaxially aligned with first opening 32 of joint body 22 for receiving a first mounting post 36 therethrough. A second bearing 50 is located proximate the second terminal end 28 of joint body 22 and is coaxially aligned with second opening 34 of joint body 22 for receiving a second mounting post 38 therethrough. A third bearing 60 may be coaxially aligned with first bearing 48 to receive mounting post 36 therethrough. Likewise, a fourth bearing 60 may be coaxially aligned with second bearing 50 for receiving mounting post 38 therethrough.

**[0027]** Mounting posts 36, 38 are received in the aperture 68 of bearing sleeves 52, 66, 67, 69. Bearing sleeves 52, 66, 67, 69 may be disposed between with the outer surfaces 70 of mounting posts 36, 38 and inner surfaces 64 of openings 62 of bearings 48, 50, 58, 60. Bearing sleeves 52, 66, 67, 69 facilitate rotation of mounting posts 36, 38 about their respective longitudinal axes relative to joint body 22. Bearing sleeves 52, 66, 67, 69 may take any form that decreases resistance rotation, such as, without limitation, a bushing, pin bearings, roller bearings, or ball bearings. The bearing sleeves 52, 66, 67, 69 may be fabricated of any material suitable for reducing frictional resistance between posts 36, 38 and bearings 48, 50, 58, 60, such as plastics, composites, polymers, glass, and metals such as steel, aluminum, brass, and various alloys. In the embodiment depicted in FIGS. 2 and 3, bearing sleeves 52, 66, 67, 69 are bushings 72 made of a material that is softer than mounting post 36 and inner surface 64 of bearings 48, 50, 58, 60, such as a brass or plastic.

**[0028]** At least a first brake 54 functions to hold medical light 12 in a desired position to illuminate a patient while at the same time allowing easy adjustment of

the light's position. In the embodiment shown, first brake 54 is positioned proximate first bearing 48 of first terminal end 26 of joint body 22 and a second brake 56 is positioned proximate second bearing of second terminal end 28 of joint body 22.

**[0029]** Brakes 54, 56 have surfaces 74 for frictionally engaging mounting posts 36, 38 to resist rotation of the post 36, 38 relative to joint body 22. Brake 54, 56 may be semicircular or any other shape capable of frictionally engaging mounting post 36. Brakes 54, 56 may be coupled to articulating joint 10 by any suitable mechanism, such as with bolts, clamps, locks, lugs nut, pins, rivets, or screws. In one embodiment, brakes 54, 56 are coupled to joint body 22 with screws 76.

**[0030]** Brakes 54, 56 may be fabricated from any suitable braking material such as, without limitation, plastics, metals, composites, polymers, and alloys. It is contemplated that brakes 54, 56 may be made from a single material or from multiple materials. For example, brakes 54, 56 may include a post engaging portion 80 and an outer supporting portion 82. Post engaging portion 80 may be made from a braking material, such as, without limitation, a plastic, composite, soft metal, or cloth, and outer portion 82 may be made from a structural material, such as harder plastic, metal, or composite. Regardless of whether brakes 54, 56 are made from one or multiple materials, in one embodiment, the post engaging surfaces 74 of brakes 54, 56 are made from a material that is softer than posts 36, 38. Using a relatively soft material allows for easier maintenance of articulating joint 10 by simply changing brakes 54, 56 as it wears instead of having to change the entire posts 36, 38.

**[0031]** Brakes 54, 56 may be biased in directions to frictionally engage mounting posts 36, 38. As seen in FIGS. 2 and 3, in one embodiment, brakes 54, 56 are biased to uniformly to maintain frictional engagement with mounting posts 36, 38 by coupling brakes 54, 56 to joint body 22 with screws 76 and compressing springs 84 between screw head 86 and brakes 54, 56. Brakes 54, 56 may alternatively be biased with at least one spring, or with some other elastomeric material. The bias may be adjusted to increase or decrease the frictional engagement of brakes 54, 56 with mounting posts 36, 38. For example, screws 76 may be turned such that they further compress springs 84 thereby increasing the bias. This configuration allows for easy adjustment of the frictional engagement of brakes 54, 56 with mounting posts 36, 38 independently of cover 24, thereby avoiding problems associated with the prior art devices.

**[0032]** Mounting posts 36, 38 coupled to the medical light 12 or support structure 14 are generally cylindrical having first and second ends 90 and 92, respectively. First ends 90 of mounting posts 36, 38 are configured for coupling to medical light 12 or support structure 14, and second ends 92 of mounting posts 36, 38 are configured for engaging joint body 22 of articulating joint 10. Second ends 92 of mounting posts 36, 38 may also have grooves 100 around at least a portion of their circumference to engage a retaining element to secure mounting posts 36, 38 to joint body 22. For example, as seen in Figs. 2 and 3, mounting posts 36, 38 may have grooves 100 around the circumference near second ends 92. Posts 36, 38 may then be retained in joint body 22 with ring clamps 102. Other examples of retaining elements include, without limitation, screws, pins, nuts, and washers.

**[0033]** As illustrated in FIGS. 1-3, one exemplary embodiment of the present invention includes a double arcuate articulating joint 10, a medical light 12 coupled to a first post 36, and a support structure 14 coupled to second post 38.

**[0034]** Articulating joint 10 consists of a joint body 22 and a cover 24. Joint body 22 has first and second terminal ends 26, 28. At the first terminal end 26, first brake 54 is disposed between first bearing 48 and third bearing 58 proximate first terminal end 26. First post 36 is received in first and third bearing 48, 58. Bearing sleeves, 52, 66 are disposed between the outer surface of first post 70 and inner surface 64 of first and third bearings 48, 58. Washer 110 and ring clip 102 engage and retain the second end 92 of first post 36 in joint body 22. Bearing sleeves 52, 66 are bushing type bearings having a sleeve portion 112 and a cap portion 114. Sleeve portion 112 is disposed between the inner surface 64 of bearings 48, 58 and the outer surface 70 of first post 36. Cap portion 114 of bearing sleeve 52 is disposed between lower surface 104 of the first bearings and shoulder 116 at first end 90 of first post 36. Cap portion 114 of third bearing 58 is disposed between the upper surface 106 of third bearing 58 and washer 120. Ring clip 102 is adjacent to washer 120 and engages groove 100 located near the second end 92 of first post 36, thereby retaining first post 36 in joint body 22. First brake 54 is coupled to the joint body 22 by two screws 76. Each screw 76 is associated with a spring 84 located between the screw head 86 and the outer portion 82 of first brake 54. First brake 54 is semi-circular and is biased in the direction of first post 36 by springs 84. Increasing or decreasing the compression of springs 84 by either screwing or

unscrewing the screws 76 easily adjusts the bias. In this embodiment, the bias may be easily adjusted independent of cover.

**[0035]** Similarly, proximate second terminal end 28 of joint body 22, second brake 56 is disposed between second bearing 50 and fourth bearing 60. Bearing sleeves 67, 69, are disposed between the outer surface of second post 38 and inner surface 64 of second and fourth bearings 50, 60. Bearing sleeves, 67, 69 are disposed between the outer surface of second post 38 and inner surface 64 of second and fourth bearings 50, 60. Washer 110 and ring clip 102 engage and retain the second end of second post 38 in joint body 22. Bearing sleeves 67, 69 are bushing 72 type bearings having a sleeve portion 112 and a cap portion 114. Sleeve portion 112 is disposed between the inner surface 64 of bearings 50, 60 and the outer surface 70 of second post 38. Cap portion 114 of bearing sleeve 67 is disposed between upper surface 122 of second bearing 50 and shoulder 116 at first end 90 of second post 38. Cap portion 114 of fourth bearing sleeve 69 is disposed between the lower surface 124 of fourth bearing 60 and washer 120. Ring clip 102 is adjacent to washer 120 and engages groove 100 located near the second end 92 of second post 38, thereby retaining second post 38 in joint body 22. Second brake 56 is coupled to the joint body 22 by two screws 76. Each screw 76 is associated with a spring 84 located between the screw head 86 and the outer portion 82 of second brake 56. Second brake 56 is semi-circular and is biased in the direction of the second post 38 by the two springs 84. Increasing or decreasing the compression of the springs 84 by either screwing or unscrewing the screws 76 easily adjusts the bias. Again, the bias may be easily adjusted independent of cover.

**[0036]** The first and second posts 36, 38 have first and second ends 90, 92. The first ends 90 are configured for coupling to the medical light 12 or support structure 14. The first ends 90 of the mounting posts 36, 38 have shoulder 116 adjacent to cap portion 114 of first and second bearing sleeves 52, 67 when mounting posts 36, 38 are placed in joint body 22. Second ends 92 of the posts 36, 38 are configured for engaging a retaining element. In this embodiment, the second end 92 of posts 36, 38 are retained in the post receiving structure by ring clip 102 that fits into groove 100. First and second posts 36, 38 are rotatably coupled to bearings 48, 50, 58, 60 through bearing sleeves 52, 66, 67, 69. First and second posts 36, 38 are frictionally engaged by first and second brakes 54, 56 to maintain the rotational position of the medical light 12.

**[0037]** Although only certain embodiments of this invention have been described in detail above, those skilled in the art will readily appreciate that many modifications are possible in the embodiments without materially departing from the novel teachings and advantages of this invention. The various features disclosed herein may be used alone or in any desired combination. Accordingly, all such modifications are intended to be included within the scope of this invention. For example, while this detailed description refers to dental or medical lights, it is understood that these two terms are interchangeable for the purposes of the present invention and are considered to cover lights for additional uses other than those specified herein. Further, it is contemplated that the presently claimed invention will encompass additional configurations of posts and post-receiving terminal ends having at least one bearing and at least one brake as described above. By way of example, the articulating joint could consist of first and second mounting posts extending from a central point having a first and second end, respectively. Correspondingly, both the medical light and the base could have a post receiving terminal ends having at least one bearing and at least one brake as described above extending therefrom to receive the first and second posts of the articulating joint.

WHAT IS CLAIMED:

1. An articulating joint for coupling a medical light having a first mounting post to a support structure having a second mounting post, said articulating joint comprising:
  - a joint body having first and second terminal ends;
  - a first bearing proximate said first terminal end, said first bearing having an inner surface and being adapted to receive the first mounting post along said inner surface;
  - a first brake coupled to said joint body proximate said first bearing and adjustably biased to frictionally engage the first mounting post received in said first bearing; and
  - a cover removably coupled to said joint body over at least said first bearing and said first brake.
  
2. The articulating joint of claim 1 further comprising:
  - a second bearing proximate said second terminal end, said second bearing having an inner surface and being adapted to receive the second mounting post along said inner surface; and
  - a second brake coupled to said joint body proximate said second bearing and adjustably biased to frictionally engage the second mounting post received in said second bearing;
  - said cover extending over said second bearing and said second brake.
  
3. The articulating joint of claim 1, further comprising:
  - a third bearing proximate said first terminal end of said joint body and spaced from said first bearing, said third bearing having an inner surface and being adapted to receive the first mounting post along said inner surface.
  
4. The articulating joint of claim 3, wherein said first brake is disposed between said first bearing and said third bearing.
  
5. The articulating joint of claim 3, further comprising:
  - at least one bearing sleeve coupled to at least one of said inner surface of said first bearing or said inner surface of said third bearing for receiving the first mounting post therethrough.

6. The articulating joint of claim 2, further comprising:
  - a fourth bearing proximate said second terminal end of said joint body and spaced from said second bearing, said fourth bearing having an inner surface and being adapted to receive the second post along said inner surface.
  
7. The articulating joint of claim 6, further comprising:
  - at least one bearing sleeve coupled to at least one of said inner surface of said second bearing or said inner surface of said fourth bearing for receiving the second mounting post therethrough.
  
8. The articulating joint of claim 6, wherein said second brake is disposed between said second bearing and said fourth bearing.
  
9. An illumination apparatus, comprising:
  - a medical light having a first mounting post; and
  - an articulating joint coupling said medical light to a support structure, said articulating joint comprising:
    - a joint body having first and second terminal ends,
    - a first bearing proximate said first terminal end, said first bearing having an inner surface, said first mounting post received in said first bearing along said inner surface,
    - a first brake coupled to said joint body proximate said first bearing and adjustably biased to frictionally engage said first post, and
    - a cover removably coupled to said joint body over at least said first bearing and said first brake.
  
10. The illumination apparatus of claim 9, further comprising:
  - support structure for supporting said medical light, said support structure including a second mounting post;
  - said articulating joint further comprising:
    - a second bearing proximate said second terminal end, said second bearing having an inner surface, said second mounting post received in said second bearing along said inner surface, and

a second brake coupled to said joint body proximate said second bearing and adjustably biased to frictionally engage said second post, said cover extending over said second bearing and said second brake.

11. The illumination apparatus of claim 9, further comprising:  
a third bearing proximate said first terminal end of said joint body and spaced from said first bearing, said third bearing having an inner surface, said first mounting post received in said third bearing along said inner surface.
12. The illumination apparatus of claim 11, wherein said first brake is disposed between said first bearing and said third bearing.
13. The illumination apparatus of claim 11, further comprising:  
at least one bearing sleeve disposed between said first mounting post and said inner surface of at least one of said first or third bearings.
14. The illumination apparatus of claim 10, further comprising:  
a fourth bearing proximate said second terminal end of said joint body and spaced from said second bearing, said fourth bearing having an inner surface, said second post received in said fourth bearing along said inner surface.
15. The illumination apparatus of claim 14, further comprising:  
at least one bearing sleeve disposed between said second mounting post and said inner surface of at least one of said second or fourth bearings.
16. The illumination apparatus of claim 14, wherein said second brake is disposed between said second bearing and said fourth bearing.

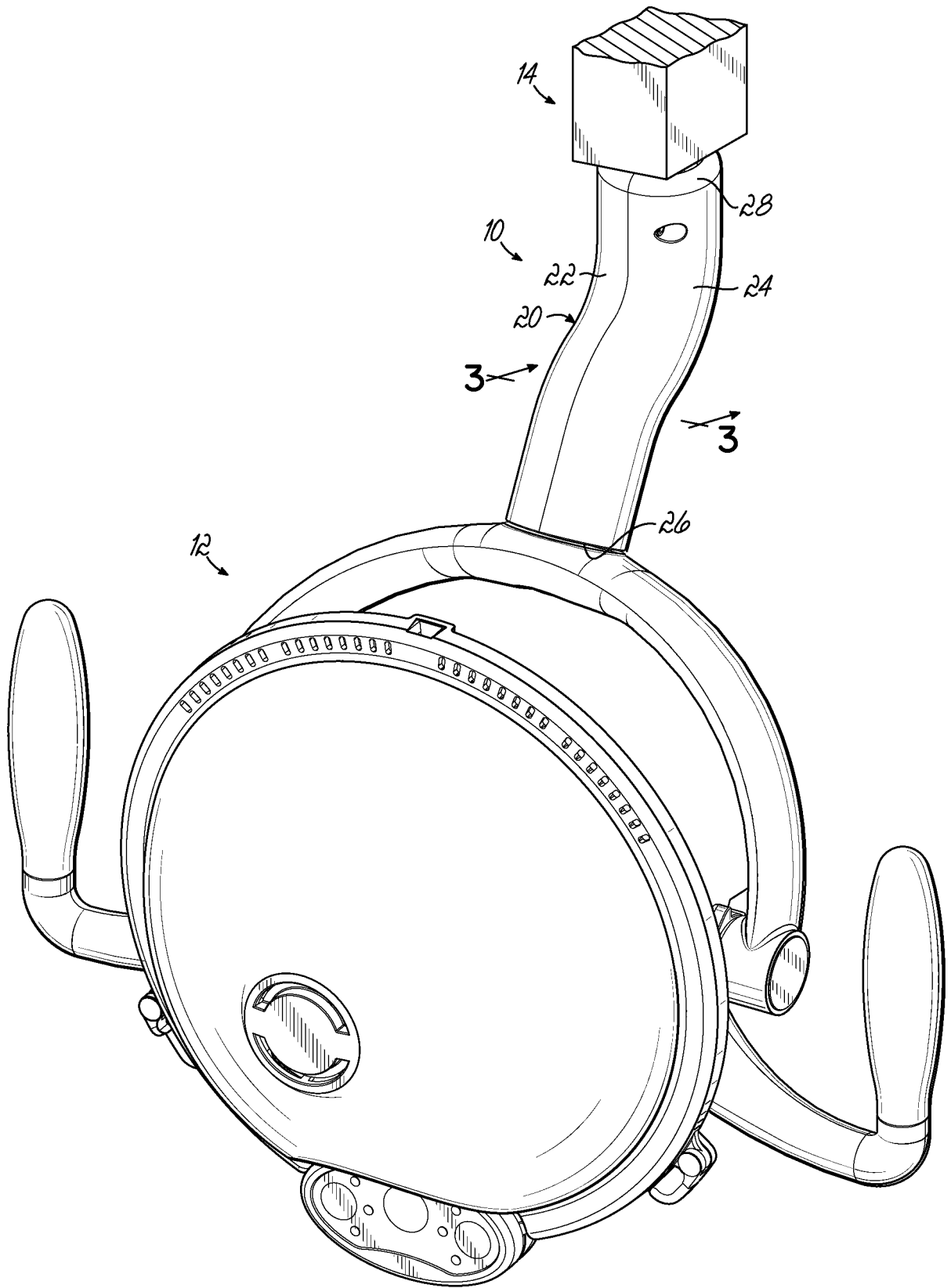


FIG. 1



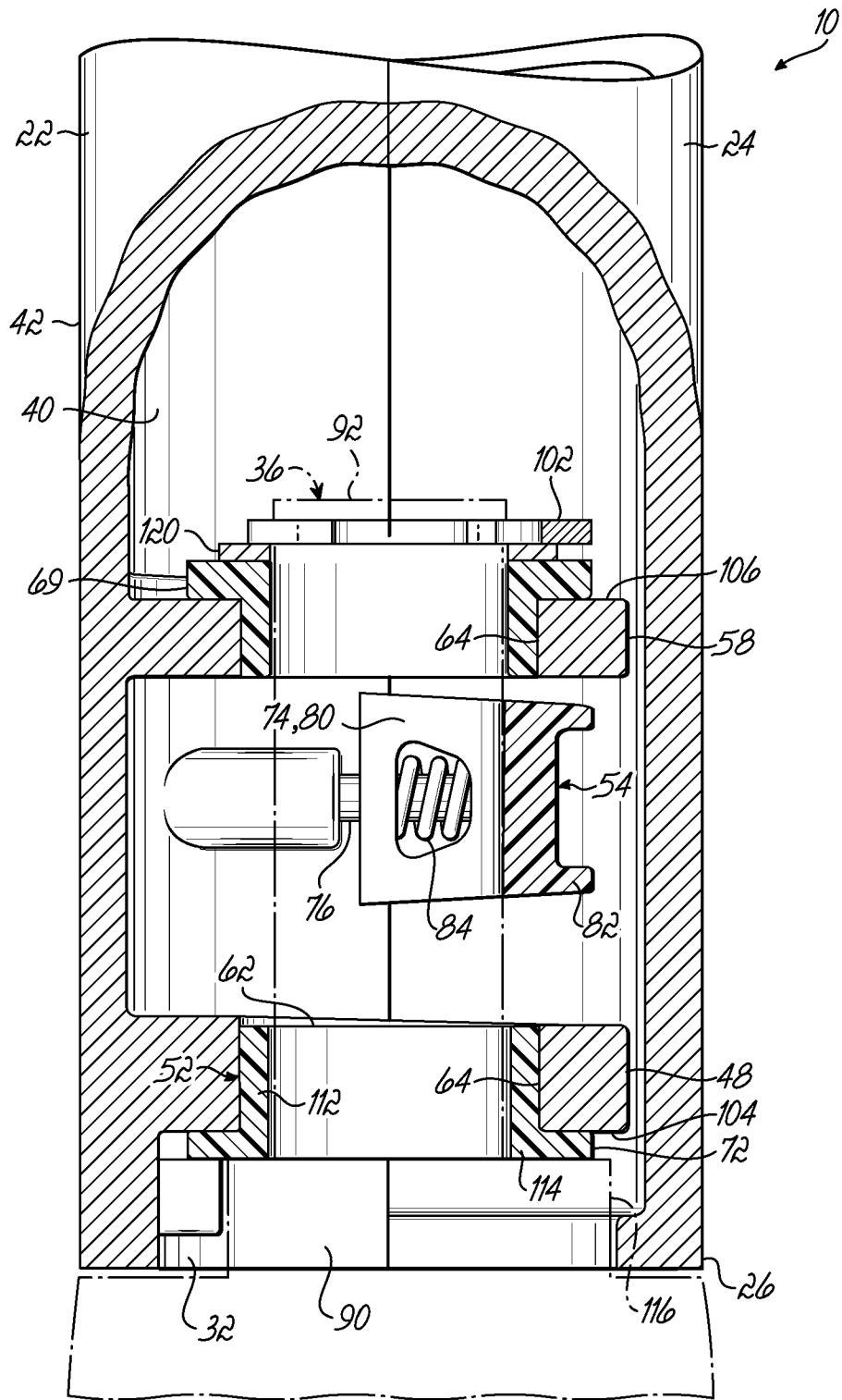


FIG. 3

INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 09/49891

<p>A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - F16C 11/00 (2009.01) USPC - 403/85 According to International Patent Classification (IPC) or to both national classification and IPC</p>																	
<p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols) IPC (8) - F16C 11/00 (2009.01) USPC - 403/85</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched IPC (8) - F16D 3/00 (2009.01) USPC - 403/43, 145-147, 84, 91, 103</p> <p>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PubWest (USPT, PGPB, EPAB, JPAB); Google Scholar Search Terms: post, brake, joint, cover, mount, dental light, medical light, swivel, arm, bearing, rotation, midmark corporation, rotary joint, surgical light, articulating joint</p>																	
<p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>Y</td> <td>US 6,030,103 A (GAMPE et al.) 29 February 2000 (29.02.2000), Fig. 1, col 5, ln 18-22</td> <td>1-16</td> </tr> <tr> <td>Y</td> <td>US 3,240,925 A (PASCHKE et al.) March 15 1966 (03.15.1966), Fig. 5, col 1, ln 13-20, col 5, ln 6-11, 23-26, 29-31, 35-37, 50-54, col 6, ln 2-5</td> <td>1-16</td> </tr> <tr> <td>Y</td> <td>US 4,517,632 A (ROOS) 14 May 1985 (14.05.1985), Fig. 2, col 3, ln 17-29, col 4, ln 34-39,</td> <td>2, 6-8, 10, 14-16</td> </tr> <tr> <td>Y</td> <td>US 4,139,883 A (ILZIG et al.) 13 February 1979 (13.02.1979), col 2, ln 4-6</td> <td>1-16</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	Y	US 6,030,103 A (GAMPE et al.) 29 February 2000 (29.02.2000), Fig. 1, col 5, ln 18-22	1-16	Y	US 3,240,925 A (PASCHKE et al.) March 15 1966 (03.15.1966), Fig. 5, col 1, ln 13-20, col 5, ln 6-11, 23-26, 29-31, 35-37, 50-54, col 6, ln 2-5	1-16	Y	US 4,517,632 A (ROOS) 14 May 1985 (14.05.1985), Fig. 2, col 3, ln 17-29, col 4, ln 34-39,	2, 6-8, 10, 14-16	Y	US 4,139,883 A (ILZIG et al.) 13 February 1979 (13.02.1979), col 2, ln 4-6	1-16
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<p><input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/></p>																	
<p>* Special categories of cited documents:</p> <table border="0"> <tr> <td>“A” document defining the general state of the art which is not considered to be of particular relevance</td> <td>“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</td> </tr> <tr> <td>“E” earlier application or patent but published on or after the international filing date</td> <td>“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td> </tr> <tr> <td>“O” document referring to an oral disclosure, use, exhibition or other means</td> <td>“&amp;” document member of the same patent family</td> </tr> <tr> <td>“P” document published prior to the international filing date but later than the priority date claimed</td> <td></td> </tr> </table>			“A” document defining the general state of the art which is not considered to be of particular relevance	“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	“E” earlier application or patent but published on or after the international filing date	“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	“O” document referring to an oral disclosure, use, exhibition or other means	“&” document member of the same patent family	“P” document published prior to the international filing date but later than the priority date claimed						
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<p>Date of the actual completion of the international search 12 August 2009 (12.08.2009)</p>		<p>Date of mailing of the international search report <b>27 AUG 2009</b></p>															
<p>Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201</p>		<p>Authorized officer: Lee W. Young  PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774</p>															