Nov. 24, 1970 J. JACOBSEN 3,543,019

EQUIPOISED LAMP

Filed Nov. 17, 1967

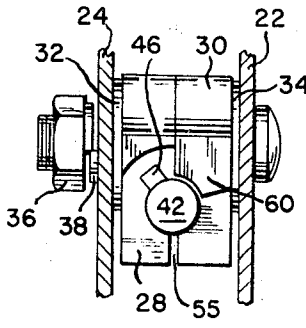



Fig. 2

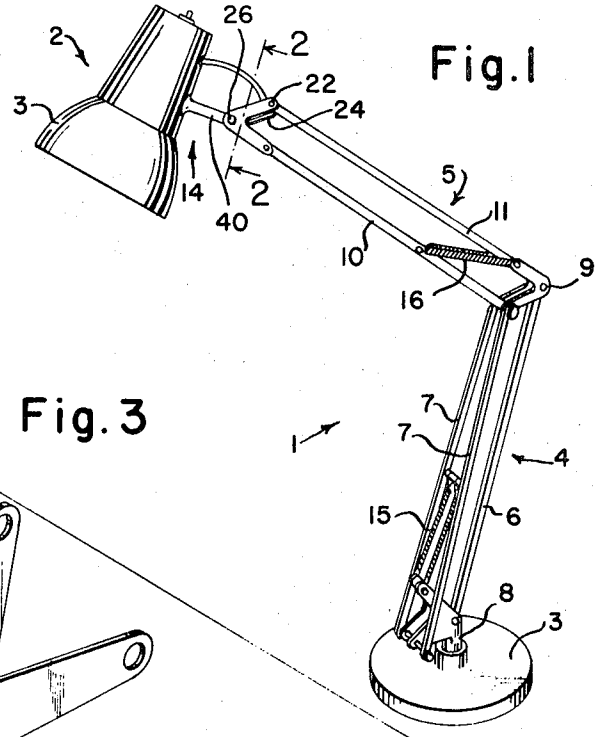



Fig. 1

Fig. 3

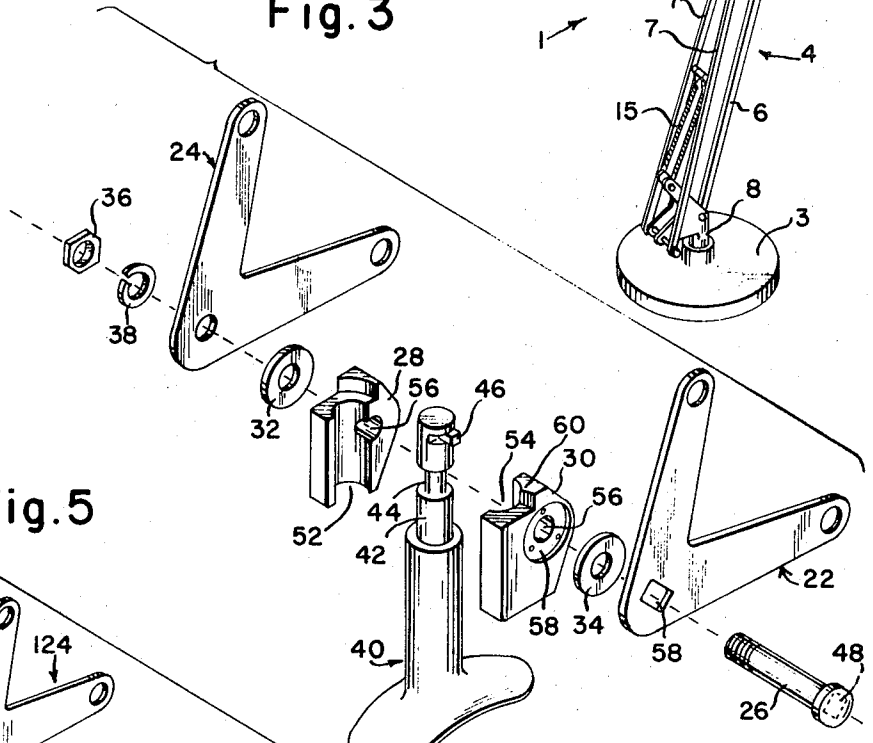
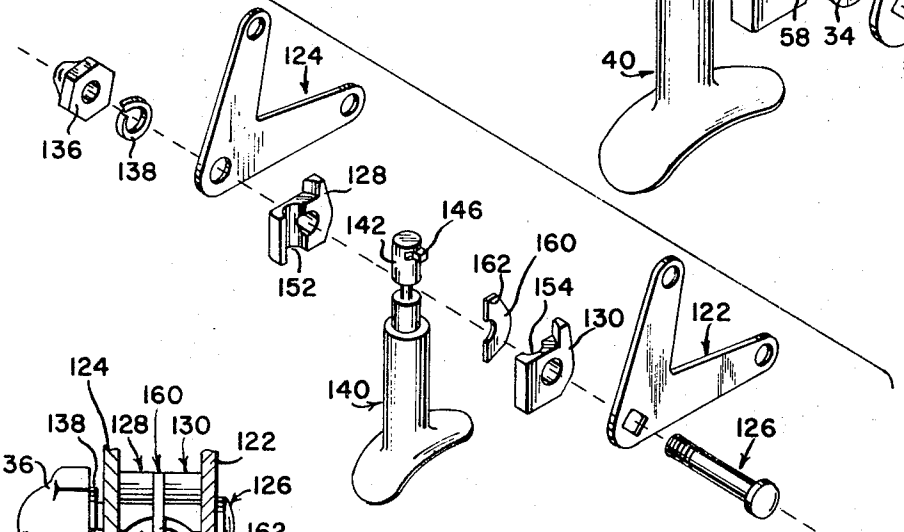



Fig. 5



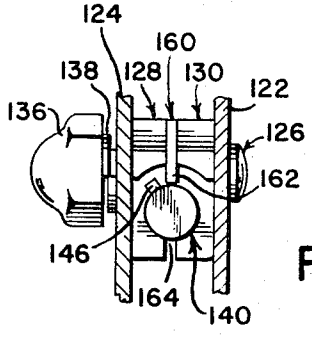




Fig. 4

INVENTOR.
Jacob Jacobsen
BY
Curtis, Morris & Safford
ATTORNEYS

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# EQUIPOISED LAMP

Jacob Jacobsen, Ekelyveien 10,
Oslo, Norway

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## ABSTRACT OF THE DISCLOSURE

An equipoised lamp is disclosed having a light and shade assembly from a vertical axis upon an arm structure so as to be moved throughout a relatively wide range. The light and shade assembly is attached to the arm structure by a special neck which permits the assembly to be swung around a horizontal axis, and also to pivot around an axis longitudinal of the neck.

This invention relates to lamps, particularly of the type where a light and shade assembly is supported by a neck structure which permits the assembly to be swung around a horizontal axis, and also permits the assembly to be turned around a second axis which is substantially transverse to the first-named axis.

An object of this invention is to provide an improved neck support for lamp assemblies. Another object is to provide improved double pivot assemblies of the type which are used to mount the shade and an enclosed socket and bulb in a reading lamp or the like. A further object is to provide structures of the above character which are sturdy and simple in construction, compact, light in weight, and adaptable to various conditions of use. These and other objects will be in part obvious and in part pointed out below.

In accordance with the present invention, an improved neck construction is provided which is particularly adapted for mounting the light and shade assembly of a lamp onto a supporting arm or bracket structure. With such devices it is necessary to provide sturdy support for the assembly and to permit adjustment of the lamp shade so that the light may be directed into the desired direction. In the illustrative embodiment of the presen invention, the lamp is of the equipoised type with the light and shade assembly mounted upon an arm assembly and with a counterbalancing mechanism for holding the light and shade assembly in any position to which it is moved. The neck assembly of the present invention permits the shade to be turned about an axis which extends horizontally so that the shade may be tipped through a substanial arc. The neck assembly also permits the shade to be rotated about an axis which is at substantially right angles to the above-mentioned axis, and which extends through the upper portion of the shade. The combination of the two movements permits the light to be directed in any direction through the wide range of both axes. The neck assembly of the present invention also provides sufficient friction to hold the lamp and shade assembly against undesired movement about either of the two axes. The friction is adjustable by the turning of a single nut, and considerable leeway is permitted with respect to wear which might cause a reduction in the friction with some constructions.

In the drawings:

FIG. 1 is a perspective view of one embodiment of the invention;

FIG. 2 is an enlarged vertical sectional view on the line 2—2 of FIG. 1, showing the neck structure which provides the mounting for the light and shade assembly;

FIG. 3 is an exploded view of the neck assembly of FIG. 2; and,

FIGS. 4 and 5 are views similar to FIGS. 2 and 3 respectively, but showing another embodiment of the invention.



Referring to FIG. 1 of the drawings, a lamp **1** has a lamp head **2** which is formed by a lamp shade **3** and a unit therein which is not shown but which comprises a bulb and socket, and a manual switch for turning the light on and off. Lamp head **2** is mounted by a neck assembly **14** upon the upper end of an upper lever assembly **5**, the other end of which is connected to the upper end of a lower lever assembly **4**. Assembly **4** is pivoted upon a base **3** which rests upon a table or desk and is weighted so as to provide a satisfactory base mounting. Lever assembly **4** consists of a single arm **6** and a pair of parallel arms **7**, and lever assembly **5** comprises two arms **10** and **11**. The lower end of each of arms **6** and **7** is pivoted to a swivel bracket **8** formed by a sheet metal bracket member and a pivot which is snugly journaled in base **3**. The upper end of the lower lever assembly **4** and the lower end of the upper lever assembly **5** are interconnected by a pivot assembly **9**, which permits arms **6**, **7**, **10** and **11** to pivot.

The upper ends of arms **10** and **11** are pivotally connected to a pair of bracket plates **22** and **24** (see also FIGS. 2 and 3) which are part of neck assembly **14**. A horizontal pivot bolt **26** extends between the bracket plates and provides a horizontal pivotal axis mounting for the neck assembly. Lamp shade **3** is attached to a pivot bracket **40** of the neck assembly which provides a pivot axis about which the lamp head **2** may be turned. The axis of pivot bracket **40** is substantially transverse to the axis of pivot bolt **26** so that the lamp head **2** may be turned to direct its light in any desired direction within the ranges of the two axes. Lever assemblies **4** and **5** are parallelogram linkages which permit the lamp head to be moved throughout the horizontal arcs of the lever assemblies without changing the direction in which the lamp head is directed. Two pairs of springs **15** and **16**, mounted respectively on assemblies **4** and **5**, provide counterbalancing forces, so that the lamp will remain at rest in any selected position.

The present invention is concerned with neck assembly **14** (see FIG. 2), which is formed by the pair of bracket plates **22** and **24**; a pair of half-bearings **28** and **30**; a pair of fiber friction washers **32** and **34**; the pivot or axle bolt **26**; a nut **36** and a lock washer **38** for pivot bolt **26**; and transverse pivot bracket **40** which has an axle or pivot portion **42**. Pivot portion **42** has an annular channel **44** which has the tangential contour of the side of bolt **26** so that the bolt may extend along the side of the pivot portion through the channel, and bracket **40** may be turned about its axis. Near the extreme end of pivot portion **42** of bracket **40** there is a stop lug **46** which extends radially outwardly beyond the periphery of the pivot portion. As indicated by the broken line in FIG. 3, axle bolt **26** extends through the bracket plates, the friction washers, and the half-bearings, and a swuared portion **48** at the head of the axle bolt nests in a square hole **58** in bracket plate **22** so as to prevent the bolt from turning with respect to the bracket plate. Each of the half-bearings **28** and **30** has a semi-cylindrical channel, **52** and **54**, respectively, which mate to form a transverse cylindrical bore for the pivot portion **42** of pivot bracket **40**. Each half-bearing also has a bore **56** in which axle bolt **26** is snugly received, and an annular dish-like pocket **58** which snugly receives the adjacent friction washer **34**.

In assembling the neck assembly **14** (see FIG. 3), the half-bearings are first positioned on the pivot portion **42** of the pivot bracket **40**, and the friction washers are positioned against the sides of the half-bearings. Bracket plates **22** are then positioned against the friction washers and axle bolt **26** is pushed through the assembly. As pointed out above, the annular channel **44** is intersected by the side of the axle bolt **26** so that the pivot bracket **40** may turn about its axis but it is held from relative axial move-

ment by its interengagement with axle bolt **26** and the annular channel **44**. Hence, the neck assembly provides swinging movement for the lamp head around the axis of axis bolt **26** and with respect to brackets **22** and **24**, and it also permits rotation of the lamp head about the axis transverse of pivot portion **42**.

It is desirable to limit the turning movement of the lamp head because turning movement beyond a full turn would twist the electrical wire through which electricity is supplied. The limit of the turning movement is provided by stop lug **46** on the end of pivot bracket **40** and a stop segment **60**, which is an extension on the end of half-bearing **30**. Except for this stop segment **60**, half-bearings **28** and **30** are cut away throughout the arcuate path of stop lug **46**. Hence, pivot bracket **40** may be turned through a substantial arc, i.e., between the two positions where the stop lug engages the stop segment. In this embodiment, the turning arc of pivot bracket **40** is 270° so that the lamp head may be turned 135° each way from a central position where the shade and the light are directed directly downwardly.

The engagement of the surfaces of half-bearings **28** and **30** with the surface of pivot portion **42** also provides sufficient friction to hold the lamp head in any position to which it is turned about that axis. The friction may be increased by tightening nut **36**. The channels **52** and **54** in the half-bearings are slightly less than semi-cylindrical so that the half-bearings do not meet along their bottom edges at a slot **55** below the pivot portion **42**. Hence, while the tightening of nut **36** clamps the half-bearings together at the bottom, the upper portions of the half-bearings exert forces against the opposite sides of the pivot portion. The tightening of nut **36**, therefore, provides a very satisfactory adjustment of the friction forces resisting the turning movement of pivot bracket **40**. Friction washers **32** and **34** are nested in fixed relationship against the respective sides of half-bearings **28** and **30**. Hence, the turning movement of the half-bearings between bracket plates **22** and **24** is resisted by the friction between the friction washers and the bracket plates. This friction is sufficient to hold the lamp head in any adjusted position to which it is turned about the axis of pivot bolt **26**, and the friction is controlled by the tightening or loosening of nut **36**. It is thus seen that a very compact and sturdy neck construction is provided wherein the parts are held in fixed relationship and the double pivot mounting is provided for the lamp head. The axle bolt **26** remains stationary with respect to the bracket plates **22** and **24**, and it performs the function of holding the pivot portion **42** of the pivot bracket in its proper axial relationship without interfering with the desired movements between the various components.

In the embodiment of FIGS. 4 and 5, the construction is similar to that of the embodiment of FIGS. 1 to 3 except for the features which will now be described. In the embodiment of FIGS. 1 to 3 the half-bearings **28** and **30** are metal, whereas in FIGS. 4 and 5 the half-bearings **128** and **130** are molded plastic, i.e., Delrin. Also, in FIG. 3 there is no stop segment **60**, and a metal plate **160** is positioned between the half-bearings and has a stop portion **162** which is positioned in the path of stop lug **146**. The Delrin plastic from which half-bearing **128** and **130** are formed is somewhat elastic and plate **160** is of spring steel. Hence, when the pivot bracket **140** is turned to a position where stop lug **146** engages stop portion **162**, some resiliency is exhibited in the stopping of the turning movement. Stated differently, when lug **146** strikes the metal plate **160** between the plastic half-bearings, there is a springy action which gives a warning that the limit of turning movement has been reached and thereafter the turning movement is completely stopped. This action is aided by a slot **164** between the lower portions of the half-bearings **128** and **130**. The half-bearings are held against the sides of plate **160** and slot **164** is the same width as the thickness of the plate. When lug **146** engages



the stop portion **162** the initial reaction is to twist the plate and deform the plastic half-bearings slightly and slot **164** promotes that resiliency. Slot **164** also permits the half-bearings to move toward each other so as to maintain the frictional inter-engagement with pivot portion **142** even when the half-bearings become worn. In the embodiment of FIGS. 4 and 5, the Delrin plastic provides the desired frictional relationship with the bracket plates and no friction washers are used.

It is thus seen that the neck construction provides a very satisfactory mounting for the lamp head. The resilient stop action of the embodiment of FIGS. 4 and 5 provides a safety feature which prevents undesirable strain upon the parts. In the embodiment of FIGS. 1 to 3 lock washer **38** is somewhat spiral so that it holds the components together with a certain amount of resiliency. In both the illustrative embodiments the resiliency provides the desired frictional characteristics so that the lamp head may be moved without difficulty but yet will remain in a selected position.

What is claimed is:

**1.** In a lamp construction having a lamp head and supporting means therefor, a friction joint mounting said lamp head upon said supporting means comprising, first and second pivot means, said first pivot means being attached to said lamp head and having a first pivot axis, said second pivot means having a pivot axis which is tangential to said first pivot axis, bearing means forming bearing journals for both of said pivot means comprising, two mating cooperating bearing members which mate to form a clamping journal bearing for one of said pivot means, each of said bearing members having a journal bore in which the other of said pivot means is journaled, mounting means positioned upon the opposite sides of said bearing members and providing mounting openings for the ends of said other of said pivot means, and clamping means clamping said mounting means against the sides of said bearing members to provide the desired friction relationship between said bearing members and said one of said pivot means and also between said bearing members and said mounting means, one of said pivot means having an arcuate groove through which the other of said pivot means extends and which presents a surface which mates with the surface of the other of said pivot means within the area where said axes are nearest to each other whereby said pivot means are held in engagement with each other.

**2.** Apparatus as described in claim **1** wherein said first pivot means has an arcuate groove and said second pivot means has a cylindrical portion which extends into said groove whereby said first pivot means is held from axial movement by the coextensive surfaces of said groove and said cylindrical portion.

**3.** In a lamp construction having a lamp head and supporting means therefor, a moving friction joint mounting said lamp head upon said supporting means comprising, first pivot means attached to said lamp head and having a first pivot axis, second pivot means having a pivot axis which is tangential to said first pivot axis, half-bearing means forming bearing journals for both of said pivot means comprising, a plurality of cooperating bearing members which mate to form a friction clamping journal-bearing for said first pivot means, each of said half-bearing members having a journal bore in which said second pivot means is journaled, mounting means positioned upon the opposite sides of said half-bearing members and providing mounting openings for the ends of said second pivot means, and clamping means clamping said mounting means against the sides of said half-bearing members to provide the desired friction relationship between said half-bearing members and said first pivot means and also between said half-bearing members and said mounting means thereby to permit manual pivot adjustment of said lamp head about each said pivot axis, and wherein one of said pivot means has an arcuate groove

through which the other of said pivot means extends and which presents a surface which mates with the surface of the other of said pivot means within the area where said axes are nearest to each other whereby said one pivot means is held from axial movement by its engagement with the other of said pivot means.

4. In a lamp construction having a lamp head and a spindle thereon, a moving friction joint mounting said lamp head and said spindle comprising, first pivot means attached to support members and having a first pivot axis, a spindle including an extension comprising a second pivot means having a pivot axis which is tangential to said first pivot axis, a pair of bearing units having friction side surfaces which mate to form a friction journal bearing substantially surrounding said second pivot means and presenting surfaces which mate with the surfaces thereof to provide rotary sliding movement therebetween which is resisted by friction, said support members including side plate means positioned along said side surfaces and presenting friction mounting surfaces coextensive with said friction side surfaces and adjustable clamping means providing clamping forces transverse to said second pivot axis to clamp said side plate means and said bearing units together to provide adjustable friction pressure between said friction surfaces whereby said spindle may be pivoted by turning said bearing units about said first axis thereby to overcome predetermined friction forces along the general planes of said friction surfaces and the mating surfaces thereby to permit manual pivotal adjustment of said lamp head about each said pivot axes, said second pivot means having a stop means which extends radially outwardly, and a second stop means affixed to said bearings units in the arcuate path of the first named stop means, said second stop means comprising a metal plate clamped between said bearing units and having a stop portion which is positioned in the path of the first named stop means.

5. In an equipoised lamp of the type having a lamp head and a supporting arm assembly which is counterbalanced and which is adapted to swivel at one end upon a vertical axis and to support the lamp head at its free end and to permit the lamp head to be moved throughout a predetermined range, that improvement which comprises a universal neck joint mounting the lamp head upon said free end of said arm assembly comprising, a pivot bracket forming first pivot means attached to said lamp head and having a pivot portion with a first pivot axis extending substantially transversely of the central axis of the lamp head, an axle bolt forming a second pivot means having a pivot axis which is tangential to said first pivot axis, bearing means forming bearing journals for both of said pivot means comprising a pair of bearings which mate to form a rotary journal bearing for said pivot portion of said pivot bracket, said pivot portion of said pivot bracket and said bearing means having mating bearing surfaces which are substantially cylindrical, said bearing means having integral first stop means extending axially from one end of said bearing surfaces adjacent to a portion of said first pivot means, said pivot portion of said pivot bracket having second stop means affixed thereto and positioned in circumferential alignment with said first stop means whereby said stop means limit the turning movement of said first pivot means with respect to said bearing means, said first pivot means having an arcuate peripheral groove in which said axle bolt is positioned thereby to hold said first pivot means from axial movement with respect to said bearings, each of said bearings having a journal bore in which said axle bolt is journaled and a pair of bracket plates positioned upon the opposite sides of said bearings and providing mounting journals for the ends of said axle bolt, said axle bolt clamping said bracket plate against the sides of said bearings to provide the desired frictional relationship between said bearings and said first pivot means and also between said bearings and said pivot portion of said pivot bracket thereby to permit manual pivotal adjustment of said lamp head about each said pivot axes.



6. In a lamp construction having a lamp head and a spindle thereon, a moving friction joint mounting said lamp head and said spindle comprising, first pivot means attached to support members and having a first pivot axis, said spindle including an extension comprising a second pivot means having a pivot axis which is tangential to said first pivot axis, a pair of bearing units having friction side surfaces which mate to form a friction journal bearing substantially surrounding said second pivot means and presenting surfaces which mate with the surfaces thereof to provide rotary sliding movement therebetween which is resisted by friction, said support members including side plate means positioned along said side surfaces and presenting friction mounting surfaces coextensive with said friction side surfaces and adjustable clamping means providing clamping forces transverse to said second pivot axis to clamp said side plate means and said bearing units together to provide adjustable friction pressure between said friction surfaces whereby said spindle may be pivoted by turning said bearing units about said first axis thereby to overcome predetermined friction forces along the general planes of said friction surfaces and the mating surfaces thereby to permit manual pivotal adjustment of said lamp head about each said pivot axes, said second pivot means having an arcuate peripheral groove through which said first pivot means extends and which presents a surface contacting the surface of said first pivot means to thereby hold the second pivot means from axial movement.

7. Apparatus as described in claim 6 wherein said second pivot means has stop means which extends radially outwardly, and second stop means fixed to said bearing units in the arcuate path of the first-named stop means.

8. Apparatus as described in claim 3 wherein said second stop means comprises an integral extension on one of said bearing units.

9. Apparatus as described in claim 6 wherein said half-bearings are clamped together at one side of said first pivot means and are held from contact with each other at the other side of the first-named pivot means by their engagement with said first pivot means.

10. Apparatus as described in claim 6 wherein said bearing units are of plastic and said stop means includes a metallic member positioned between said bearing units which acts with said bearing units to provide a resilient stop relationship with the first named stop means.


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JOHN M. HORAN, Primary Examiner

M. H. HAYES, Assistant Examiner

U.S. Cl. X.R.

240—69, 70, 73; 248—280, 281

# UNITED STATES PATENT OFFICE
# CERTIFICATE OF CORRECTION

Patent No. 3,543,019 Dated November 24, 1970

Inventor(s) Jacob Jacobsen

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 5, line 72: delete "plate" and substitute--plates--

Column 5, line 74: delete "first pivot" and substitute --bracket plates--.

Column 5, line 75: delete "means".

Column 6, line 37: delete "3" and substitute--7--.

Column 6, line 41: delete "first" and substitute--second--

Column 6, line 43: delete "first named" and substitute--second--.

Column 6, line 44: delete"first" and substitute--second--.

Signed and sealed this 1st day of June 1971.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

WILLIAM E. SCHUYLER, J
Commissioner of Patent