

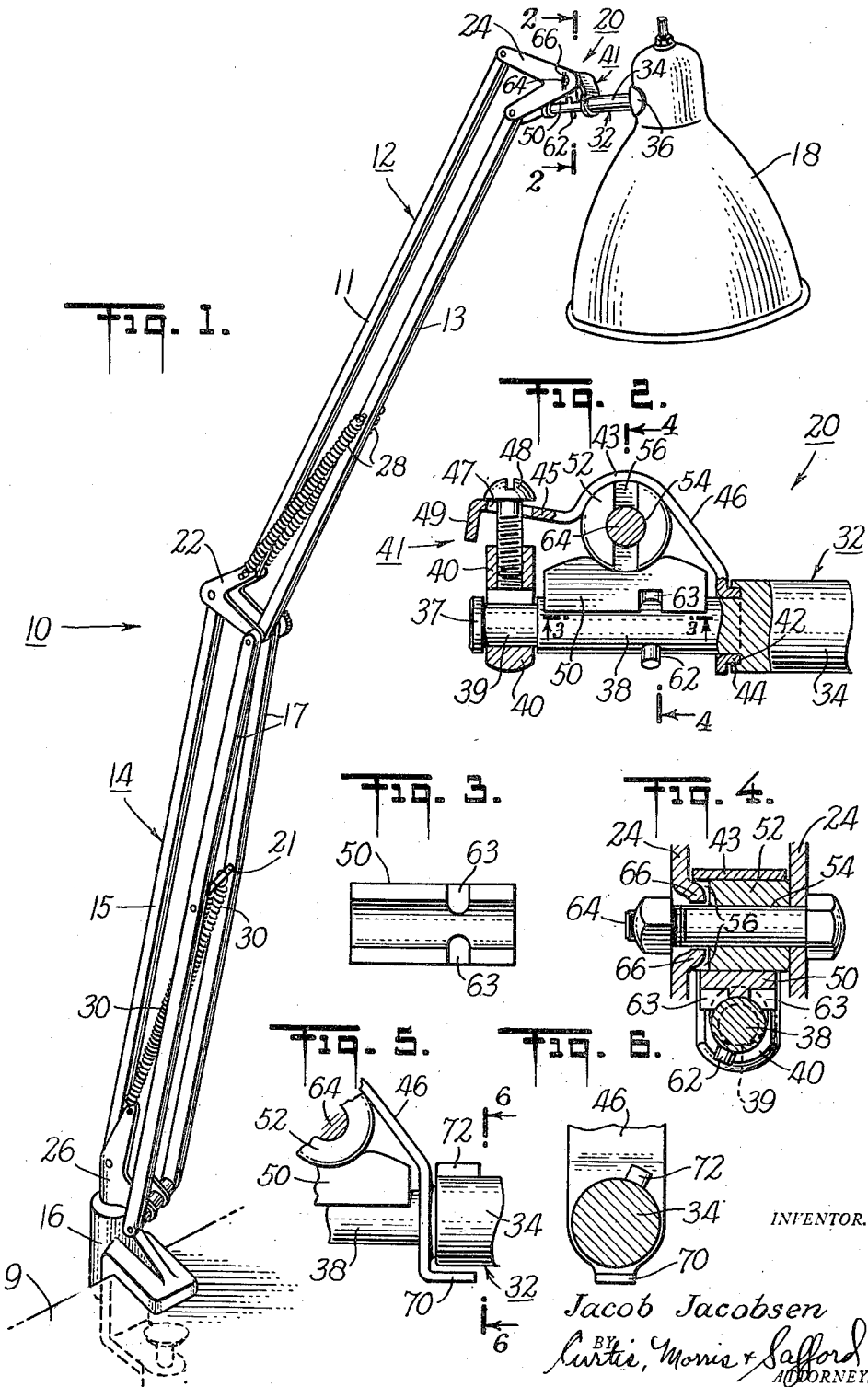
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EQUIPOISED LAMP STRUCTURE

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1

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EQUIPOISED LAMP STRUCTURE

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This invention relates to an improvement in lamp structures of the type generally referred to as an equipoised lamp, i. e. lamps that remain in any of a variety of positions to give a desired illuminating effect. More particularly, this invention relates to a universal pivot mounting for the lamp fixture of an equipoising lamp.

An object of this invention is to provide improved apparatus of the above character which is light in weight, simple in construction and efficient and dependable in use. A further object is to provide the above in such a manner to avoid the difficulties which have been encountered in similar apparatus in the past. A further object is to provide a combined equipoised lamp fixture or mechanism and a universal pivot mechanism for the lamp fixture which is adapted to meet the various problems which are encountered in actual use. It is a still further object of the present invention to provide a universal swivel joint in which the frictional forces of the various pivotal movements may be controlled by a single adjustment. These and other and further objects will be in part apparent and in part pointed out as the specification proceeds.

In the drawings:

Figure 1 is an over-all perspective view of one embodiment of the invention;

Figure 2 is a sectional view taken on the line 2—2 of Figure 1 showing the universal pivot mechanism;

Figure 3 is a bottom plan view on the line 3—3 of Figure 2 and showing the longitudinal channel of the friction block;

Figure 4 is a sectional view taken on the line 4—4 of Figure 2;

Figure 5 is a fragmentary side view similar to Figure 2 showing another form of the invention; and

Figure 6 is a sectional view on line 6—6 of Figure 5.

Referring now to Figure 1, there is shown an equipoised lamp structure 10 which has an upper pivoted lever assembly 12 and a lower pivoted lever assembly 14, and a clamp base member 16. Base member 16 is clamped to a table or desk 9 and has a swivel bearing in which is mounted the lower lever assembly 14. A lamp fixture and shade assembly 18 is mounted in a universal pivot joint assembly 20 at the upper end of the upper lever assembly 12.

Each of the pivoted lever assemblies 12 and 14 comprises generally a parallelogram linkage connected to a common intermediate frame unit 22 and carrying respectively at the top and bottom ends thereof corresponding frame units 24 and 26. Units 22, 24, and 26 are of heavy sheet steel, and each unit has two pairs of arms or ears with each pair being parallel and forming a pivot connection. Linkage 12 is formed by two bars 11 and 13 pivoted as shown to units 22 and 24; and linkage 14 is formed by a bar 15 and a pair of bars 17, which are pivoted as shown to units 22 and 26. A pair of tension springs 28 is connected between unit 22 and bar 13, there being a pair of hooks on bar 13 and a pair of hooks on

2

the two arms of unit 22. Similarly, a pair of tension springs 30 is connected between bars 17 and unit 26, with the springs being held at one end by a pin 21 carried by the bars and a pair of holes in two arms of the unit. Springs 28 and 30 are of the helical tension type where the pull exerted is proportional to the increase in length.

The universal pivot joint assembly 20 comprises, a shaft 32 having a large portion 34 which has at its end an integral flange 36 which is shaped to fit the outer surface of the top of the shade assembly 18. The shaft has a threaded extension (not shown) which extends through an opening in the shade assembly, and a nut clamps the shade assembly to this end of the shaft. The other end 38 of shaft 32 is reduced in diameter and has at its end an annular recess 39, at the left of which there is end flange 37. Positioned within this recess 39 is collar 40 which has an opening of sufficient diameter to permit the flanged end of shaft 32 to pass through the opening. However, as will be explained more fully below, collar 40 is held with its lower portion positioned within the recess 39. Collar 40 is a portion of a friction adjustment mechanism 41. At the shoulder junction of portions 34 and 38 of shaft 32 there is an annular recess 42, into which is snugly received an annular collar or flange 44 of a leaf spring tension member 46. Tension member 46 has a central arcuate portion 43, a flat extension 45 which extends radially of the axis of the arcuate portion, and an overhanging flange 49. The flat extension 45 has an elongated hole or slot 47, through which a screw 48 extends loosely, and the end of this screw is threaded into collar 40, thus to provide a rigid connection between the collar and the screw. Positioned between the tension member 46 and portion 38 of shaft 32 are two friction members, a friction block or shoe 50 extending longitudinally of shaft 32 and having a friction face which mates with the outer surface of portion 38, and a cylindrical friction member or bushing 52 which is held against an arcuate friction surface in the top of shoe 50 by the arcuate portion 43 of tension member 46. The friction bushing 52 has a central opening or bore 54 through which a bolt 64 (see Figure 4) extends. The friction bushing also has at one end (the left in Figure 4) a transverse or diametrical slot 56.

Friction bushing 52 (Figure 4) is clamped between the two side arms or members of unit 24, the left-hand member of which has a pair of detents or lugs 66 which extend into recess 56 in the end face of the friction bushing. Hence the friction bushing is held from relative movement with respect to unit 24.

Referring again to Figure 2, screw 48 pushes the left-hand end of the tension member 46 toward the end of shaft 32 so that the tension member is in the nature of a cantilever spring anchored at its right-hand end to the shaft and having its arcuate portion 43 resting upon the mating surface of the friction bushing 52. Thus a frictional force is exerted which provides friction between the tension member and the friction bushing and also between the friction bushing and the mating surface of shoe 50. This force also acts to provide a friction force between the shoe 50 and the mating surface of the portion 38 of shaft 32, and there is some frictional engagement between collar 40 and surface of shaft 32 at recess 39. Screw 48 may be adjusted with a screw driver so as to increase or decrease the tension exerted by tension member 46, i. e., the turning of screw 48 further into collar 40 increases the forces exerted by this tension member and the turning of the screw from the collar decreases these forces. It is thus seen that by a simple adjusting of screw 48, the frictional forces may be changed over a relatively wide range.

The friction between shoe 50 and the surface of shaft portion 38 is effective to resist turning movement of shaft 32, and (Figure 1) the lamp and shade assembly 18 may therefore be turned around a horizontal axis with respect to the frame unit 24. When turned against this friction, the shade assembly will remain in the adjusted position. Similarly, the shade assembly may be turned about the horizontal axis formed by bolt 64 (see also Figure 2) and during such movement, the friction bushing 52 is held relatively stationary by the detents on lugs 66 which project into the portions of groove 56, while tension member 46 and shoe 50 turn with the lamp assembly. Therefore, the friction between the friction bushing 52 and the tension member, and also shoe 50 resists this turning of the lamp and shade assembly 18 about the axis of bolt 64 so that these frictional forces are effective to maintain any adjusted position of the lamp and shade assembly about this axis.

The turning of shaft 34 with respect to shoe 50 is limited by a pin 62 (Figure 2) anchored in the portion 38 of the shaft. The shoe 50 is cut away at 63 (see also Figure 4) upon its two sides so as to permit maximum desired turning movement of the shaft and the lamp about the axis of the shaft.

Referring again to Figure 1, the lamp and shade assembly 18 may be turned about the two horizontal axes, as indicated above, with the friction being adjustable so as to provide the desired holding forces in any position of adjustment with respect to the frame unit 24. The entire head assembly comprising the lamp and shade assembly 18 and the unit 24 is then moved up and down and horizontally, utilizing the flexibility of action afforded by the upper and lower lever assemblies 12 and 14. During such movement, the vertical and horizontal axial relationship of the lamp and shade assembly 18 remains unchanged, i. e., if the axis of the lamp and shade assembly 18 is exactly vertical or in any other selected angular position, the swinging of unit 24 and the lamp and shade assembly does not alter the relationship of this axis of the lamp and shade assembly. At the same time, the lamp and shade assembly may be positioned at any desired level, or it may be moved horizontally with respect to the base unit or member 16. During all such movements, the springs 28 and 30 completely counter-balance the weight so that the movement is easy and yet the lamp and shade assembly remains in the desired or selected position.

In the embodiment of Figures 5 and 6, another arrangement is provided for limiting the relative movement between shaft 32 and the friction assembly and unit 24. In this form, the pin 62 is omitted and the slots 63 in the friction block 50 are also omitted. Shaft 32, however, carries a stop-lug 72, and the end of the tension member 46 is extended at 70 and is turned at a right angle so that it is in arcuate alignment with the lug 72. Hence, when the shaft 32 is turned, its movement is stopped by the engagement between this end portion 70 and lug 72.

As various embodiments may be made of the above invention and as changes might be made in the embodiments above set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. In an equipoised lamp mechanism which includes a linkage assembly comprising first and second parallelogram linkages and an intermediate frame member pivotally interconnecting the linkages in end-to-end relationship and a base frame member pivotally connected to the other end of said first parallelogram linkage and also includes a top frame member pivotally connected to the other end of said second parallelogram linkage and a base clamping member having a swivel therein carrying said base frame member: a universal pivot mechanism connected to said top frame member comprising, a shaft mem-

ber adapted to carry on one end thereof a lamp fixture, a leaf spring member mounted on the other end of said shaft and slidably attached at its ends to said shaft, a rigid friction block, a pivot bushing adapted to be connected to said top frame member, said friction block having two friction surfaces upon opposite sides and transverse to each other, said friction block and said pivot bushing being mounted between said shaft and said spring member with said spring member contacting said pivot bushing and said friction surfaces of said friction block respectively contacting said pivot bushing and said shaft, and an adjustment screw for varying the pressure exerted by said spring member on said pivot bushing and said friction block and shaft.

2. In an equipoised lamp structure of the type having a lamp fixture mounted on the end of an equipoising linkage, a universal swivel joint mechanism which comprises, a main shaft for the lamp fixture on one end and having a reduced diameter portion, said shaft having an annular recess in a shoulder between the different diameter portions and an annular groove adjacent the end opposite the lamp fixture, a collar pivotally carried in said groove, a spring member having an annular collar at one end positioned in said annular recess, a friction block having a longitudinal friction face on one side and a lateral friction face on the opposite side, a pivot bushing adapted to be mounted in said equipoising linkage and positioned in contact with said lateral friction face of said friction block, said pivot bushing and said friction block being positioned between said spring member and said shaft with said longitudinal friction face of said friction block engaging said shaft, and an adjusting screw connecting said spring member and first-mentioned collar to clamp said bushing and friction block together against said shaft.

3. A device as described in claim 2 wherein said longitudinal friction face has a surface area contact with said shaft substantially equal to the surface area contact of said bushing with said friction block and said spring member whereby movement about either pivotal axis is equally facilitated.

4. A device as described in claim 2 wherein said friction block has a pair of opposed recesses therein at the sides of said longitudinal friction face and said shaft carries therein a stop pin in arcuate alignment with said recesses whereby the rotation of said block about said shaft is limited to less than 360°.

5. A device as described in claim 2 wherein said spring member has an extension adjacent said annular collar, said extension being parallel to and overlying the larger diameter portion of said shaft, and wherein said shaft portion carries thereon a stop lug to engage said extension to thereby limit the rotation of said spring member about said shaft.

6. In an apparatus of the character described, a universal pivot assembly comprising, a first shaft portion having an annular groove at one end thereof and an annular recess spaced therefrom, a cantilever spring member having an annular collar at one end and an elongated hole in the other, a collar member carried in said annular groove on said shaft, said cantilever spring being positioned with its annular collar in said annular recess and said elongated hole adjacent said second-mentioned collar, and a screw member positioned in said shaft adjustably connecting said second-mentioned collar and cantilever spring member, a second shaft member disposed at right angles to said first shaft, and a friction block member, said second shaft and friction block member being positioned between said cantilever spring and said first shaft in frictional engagement therewith.

7. In a lamp structure of the character described, a universal swivel joint mechanism comprising, a shaft, a leaf spring slidably attached at its ends at longitudinally spaced portions of said shaft, a friction block extending longitudinally of said shaft between said spaced portions

5

and having a longitudinal friction surface which is held against said shaft, said friction block having a transverse friction surface on its side opposite said longitudinal friction surface, a pivot member positioned against said transverse friction surface and held in place by said leaf spring whereby said leaf spring exerts frictional force between itself and said pivot member and also between said friction block and respectively through said friction surfaces to said shaft and said pivot member, means to adjust the pressure exerted by said leaf spring, and stop means to limit the turning movement of said shaft.

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