

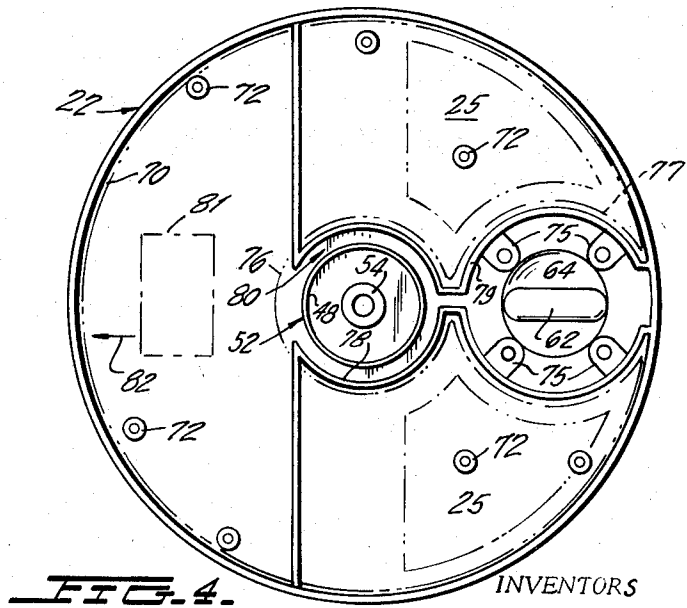
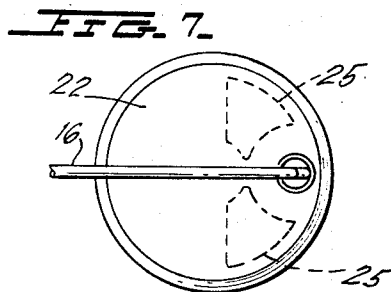
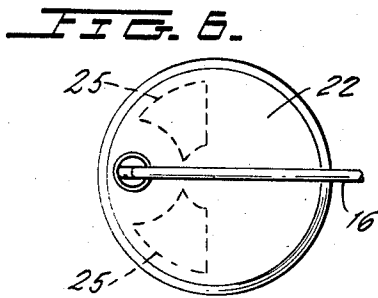
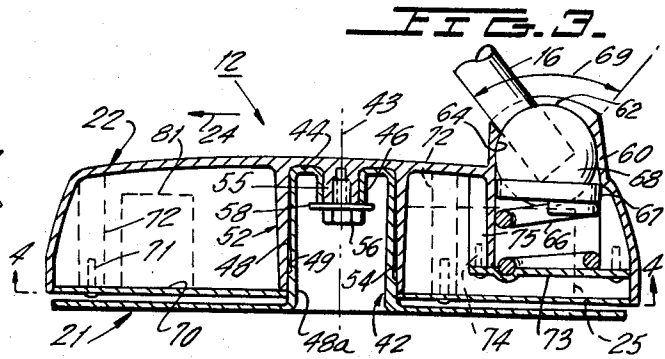
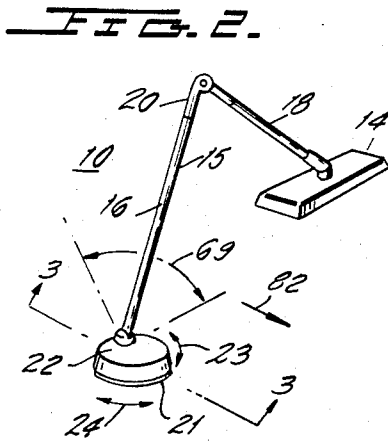
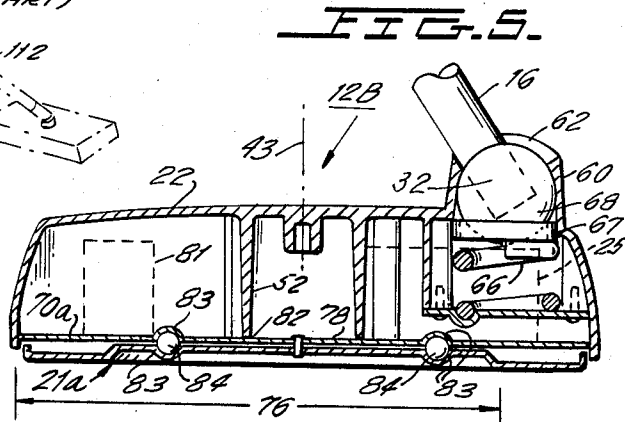
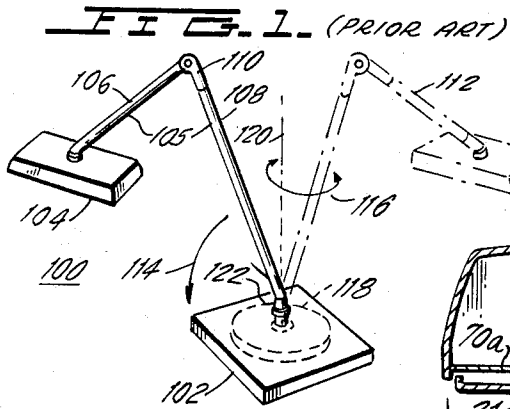
Nov. 5, 1968

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3,409,265

BASE FOR LIGHT FIXTURE

Filed Sept. 27, 1966



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3,409,265

BASE FOR LIGHT FIXTURE

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Filed Sept. 27, 1966, Ser. No. 582,363
6 Claims. (Cl. 248-415)

ABSTRACT OF THE DISCLOSURE

A base unit for desk-top lighting fixtures of the type which are not secured to the surface upon which they rest, including a first member which remains stationary with respect to the supporting surface and a second member, which carries the fixture, rotatable relative to the first member. The second member carries counterbalancing weight means as far to the rear as possible with respect to the pivotal plane of movement of the light fixture whereby tipping is prevented regardless of the extent of rotation of the second member, and hence the fixture, relative to the first member.

This invention relates to lighting fixtures, and more particularly relates to improvements in the base unit of desk-top lighting fixtures of the type which permit the user to vary the position of the light source in accordance with his needs.

A common desk-top lighting fixture in which the instant invention may find application normally includes a base, an arm assembly connected to the base, and a lighting fixture secured to the opposite end of the arm assembly. Generally speaking, the prior art teaches that the base of the lighting fixture be motionless relative to the table top and that the arm assembly be secured to the base in such a manner as to permit two degrees of freedom therebetween; that is, rotation about an axis passing vertically through the base, and pivotal movement of the arm assembly in planes defined by the table top and a vertical axis passing through the base. Similarly, the lighting fixture is secured to the opposite end of the arm assembly by means of a universal joint type coupling whereby the lighting fixture may be rotated and pivoted relative to the arm assembly. Finally, the arm assembly normally includes a pair of pipes joined by a swivel joint to permit pivotal movement therebetween. It becomes apparent that the user of the desk-top lamp may preposition the lighting fixture in virtually any position above the desk surface.

As noted above, prior art desk-top lamps require that the base thereof be motionless relative to the surface upon which it rests and permit the arm assembly to experience both pivotal and rotational movement with respect to the base to achieve the entire spectrum of movement which may be desired by the user. This type of construction has inherent disadvantages and creates problems which the instant invention effectively eliminates. Specifically, it should be first noted that for desk-top lighting fixtures (wherein the fixture is in no way secured to the desk), it is customary to secure some type of counterbalancing weight means within the base to prevent tipping when the arm assembly and fixture is extended in a direction away from the base. Since the arm assembly of the prior art

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lamps is permitted to rotate relative to the base, it becomes apparent that the prior art dictates an extremely large weight, in the sense that some portion of the weight must always be available to counterbalance tipping regardless of the extent of rotation of the arm assembly relative to the base. In the alternative, a smaller weight in the prior art desk-top lighting fixtures would require a substantially enlarged base such that a substantial cross-sectional area thereof would always be in front (toward the extended fixture) of the connection between the arm assembly and the base to counteract the tipping tendency. As an example which will later be contrasted to the instant invention, it is noted that to prevent tipping of one prior art desk-top lighting fixture which employs a 34 inch arm assembly, there is required a weight of from 14 to 16 pounds and a base 17 inches square.

In contradistinction to the prior art, the instant invention drastically reduces both the size of the base and the magnitude of weight necessary to prevent tipping of a desk-top lighting fixture while still permitting the user to both pivot and rotate the arm assembly relative to the desk. Specifically, the base of the instant invention, rather than being completely motionless relative to the desk, comprises two members, the first of which remains motionless relative to the desk while the second member is secured to the first member in such a manner as to permit relative rotation therebetween. Further, and in accord with the instant invention, the counterbalancing weight means is secured to and movable with the second member relative to the first member such that the counterbalancing weight means will always be fully effective for counterbalancing torque developed by the fixture and arm assembly regardless of the extent of rotation of the second member relative to the first.

In a preferred embodiment of the instant invention, the arm assembly in being secured to the base, first passes through an elongated slot provided on an imaginary diameter of the second member, such that pivotal movement of the arm assembly relative to the second member is confined to a plane defined by such slot and a vertical axis passing through the center of the second member. It must be appreciated, however, that although pivotal movement is limited to such a plane, the fact that the second member rotates relative to the first provides the necessary second degree of movement which is customarily provided by such desk lamps.

To achieve maximum counterbalancing effect, the counterbalancing weight means is secured to the second member as far to the rear as possible (that is, in a direction opposite toward which the arm assembly is generally extended) such that regardless of the rotation of the second member and regardless of the extent of pivotal movement of the arm assembly relative to the second member, the full weight will be available to prevent tipping. To emphasize the advantages which are achieved by means of the above described invention, it is noted for the 34 inch arm assembly (with the same light fixture), the instant invention requires a weight of from 6 to 8 pounds and a base the circular stationary member of which has a diameter of only 8 inches. Thus for the same arm assembly and lamp, the instant invention cuts the weight in half and

furthermore reduces the base surface area by approximately a factor of 5.

As an advantageous feature of the instant invention, various means may be provided for facilitating relative rotational movement between the first and second members of the base. One particularly satisfactory embodiment of the instant invention utilizes mating protrusion and protrusion-receiving cavities provided on the first and second members of the base, respectively, with the exterior and interior surfaces of the protrusion and cavity, respectively, being tapered but mis-matched to minimize the area of frictional engagement therebetween.

Accordingly, it is an object of the instant invention to provide a base unit for use in an assembly including a fixture and an arm assembly with such base unit including a first member relatively stationary with respect to a surface upon which it rests; a second member rotatable relative to the first member with such second member including means for securing the arm assembly to a given point thereon; and counterbalancing weight means rotatable with a second member relative to the first member for effectively counterbalancing torque developed by the fixture regardless of the extent of rotation of the second member relative to the first.

It is another object of the instant invention to provide such an assembly wherein the arm assembly and fixture extend generally in a first direction relative to the second member of the base and the counterbalancing weight means is positioned as far in a direction opposite the first direction as is possible relative to the second member.

Still another object of the instant invention is to provide such a base unit for a desk-top lighting fixture which drastically reduces the magnitude of the weight and the size of the base which is necessary in prior art fixtures to counterbalance tipping.

Yet another object of the instant invention is to provide such a base unit wherein the first and second members thereof include a mating protrusion and protrusion-receiving cavity, respectively, the exterior and interior surfaces of which are tapered but mismatched to minimize frictional engagement therebetween.

Other objects and a fuller understanding of the instant invention may be had by referring to the following description and drawings, in which:

FIGURE 1 is a sketch illustrating the operation of a prior art desk-top lighting fixture;

FIGURE 2 is a perspective view of a desk-top lighting fixture of the type intended to incorporate the principles of the instant invention;

FIGURE 3 is a sectional view taken along the arrows 3-3 of FIGURE 2;

FIGURE 4 is a view taken along the arrows 4-4 of FIGURE 3;

FIGURE 5 is a sectional view of an alternative embodiment of the instant invention which would be taken along the arrows 3-3 of FIGURE 2; and

FIGURES 6 and 7 are somewhat schematic sketches intended to illustrate the principles of the instant invention.

Referring to the prior art FIGURE 1, there is shown a desk-top lighting fixture 100 of the type over which the instant invention represents an improvement. The unit includes a base 102 which remains motionless relative to the surface upon which it rests, a lamp fixture 104, and an arm assembly 105 comprising pipes 106 and 108 joined by a swivel joint 110. As indicated by the phantom showing 112 and the arrows 114 and 116, such prior art units are constructed so as to permit both pivotal movement of the arm assembly 105 relative to the base 102 (two-way arrow 114) and rotational movement of the arm assembly 105 relative to the base 102 (two-way arrow 116).

Within the base 102 is a weight 118 to prevent tipping of the unit as the lamp 104 is extended away from the base. However, because the arm assembly 105 is free to rotate about the axis 120, as indicated by the phantom

showing 112, it is apparent that the weight 118 must completely surround the lower swivel joint 122 in order to effectively prevent tipping for all degrees of rotation of the arm assembly. In the alternative, the base must be substantially increased in size to provide a large cross-sectional area to combat the tipping tendency. As noted previously, a lamp such as 100 which employs a 34 inch arm (106 plus 108 when extended) requires a weight of approximately 15-16 pounds secured in a base unit dimensioned approximately 17 x 17 inches.

Turning to FIGURE 2, there is shown a lamp 10 which embodies the novel base unit 12 of the instant invention in such a manner as to drastically reduce the magnitude of weight and size of the base while at the same time prevent tipping and still provide the user with the same degree of flexibility of movement which was achieved with the prior art lamp 100 of FIGURE 1.

The lamp 10 includes the base 12, a lamp fixture 14, and an arm assembly 15 comprising pipes 16 and 18 joined by a swivel joint 20. Although in no way intended to be limited to such disclosure, the swivel joint 20 may be of the type shown and claimed in co-pending application Ser. No. 550,676 filed May 17, 1966 in the name of Louis Wichers and Harvey E. Senft, and assigned to the assignee of the instant invention. As is common in prior art, the lighting fixture 14 is generally secured to the pipe 18 by a universal joint type of connection to permit both rotation and pivotal movement therebetween.

As will be further described, the base 12 of the instant invention differs from the base 102 in prior art FIGURE 1, in that it is comprised of two members, a first relatively motionless member 21 and a second member 22 which, as indicated by the arrows 23 and 24, is rotatable relative to the first member 21. As will be further explained in greater detail, the arm assembly 15 is secured to the second member 22 and rotates therewith. Similarly, counterbalancing weight means 25 (see FIGURES 3-5) is secured to an rotatable with second member 22 such that regardless of the extent of rotation of the arm assembly 15 and lamp fixture 14, the drastically reduced weight will always be fully effective to prevent tipping.

Turning to FIGURE 3, it may be seen in greater detail that the base unit 12 includes the first plate-like member 21 which remains motionless relative to the table top on which it rests. The plate 21 includes an upstanding frustoconical protrusion 42 which includes an upper seating surface 44, a depending cylinder 46 and the upstanding side surface 48. For reasons to be further explained, the exterior surface 48 has a somewhat thicker lower portion 48a.

Seated on and rotatable relative to the protrusion 42 is the second shell-like member or cover plate 22. The plate 22 includes and integrally depending protrusion-receiving cavity 52 which seats upon and receives the protrusion 42. The interior surface 54 of such cavity is tapered at an angle which corresponds to the tapering angle of lower portion 48a of side surface 48 such that adequate stability of the cover plate 22 relative to the plate 21 is maintained while at the same time the area of engagement between interior surface 54 and exterior surface 48 is reduced to minimize friction. Note hollow 49 in FIGURE 3. Integrally disposed centrally of the cavity 52 is a depending rod-like portion 55 which is received within the cylinder 46 formed in the protrusion 42. The rod-like portion 55 is internally bored to receive a fastening element such as the screw 56 which first passes through a washer 58. The washer 58 abuts the lower surface of cylinder 46 thus securing the cover plate 22 to the base plate 21 while allowing relative rotation therebetween.

The cover plate 22 includes an upstanding housing 60 having an elongated slot 62 disposed along a diametric line which would pass through the center line 43. Disposed within the housing 60 and urged against the interior surfaces 64 thereof by a biasing spring 66 and seat 67 is a relatively large swivel ball 68 into a centrally bored

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opening of which is securely positioned one end of the pipe 16. The opposite end of spring 66 rests on a seating plate 73 which is secured within plate-like member 22 by fastening means such as 74 which are received by internally tapped posts 75. It should be apparent that the pipe 16 is constrained by the elongated slot 62 to pivotal motion within a plane defined by the center line 43 and the slot 62 (i.e., the plane represented by the numeral 69 in FIGURES 2 and 3) such that the pipe 16 and consequently the entire arm assembly cannot rotate relative to the second cover plate member 22. However, since cover plate 22 is free to rotate relative to the first plate-like member 21, rotational movement of the arm assembly and the lamp fixture 14 relative to the surface upon which a unit 10 rests is still accomplished.

Secured to and rotatable with the cover plate 22 is an intermediate or third plate 70 which, for the illustrative embodiment of FIGURE 3, is secured to the plate 22 by fastening elements such as screws 71 which are received by spaced apart integrally depending studs illustratively shown at 72.

As most clearly indicated in phantom in FIGURE 4, the intermediate plate 70 is provided with two circular openings 76 and 77 which conform generally to depending partitions 78 and 79 integrally provided within the shell-like member 22 in such a manner as to provide a raceway 80 which will accommodate wiring from the electrical components indicated as 81 around the protrusion-receiving cavity 52 and up to the pipe 16 which enters the cover member 22 through the elongated slot 62.

Counterbalancing weight means 25, shown in phantom in FIGURES 3 and 4, is seated on the intermediate plate 70 and rotates therewith in response to rotation of the cover plate 22. The particular outline chosen for counterbalancing weight means 25 is for the purpose of illustration only and in practice could comprise any shape desired (depending on the length of arm assembly 15 and the weight of the lamp fixture 14 being supported), and may be of any material which will provide the desired weight.

As indicated in FIGURE 2, the lamp fixture 14 and arm assembly 15 generally move in the plane of motion 69 in the direction indicated by the arrow 82. Such representation of direction, arrow 82, is similarly shown in FIGURE 4, it being understood that since FIGURE 4 is taken from the underside of FIGURE 3, the arrow 82 appears reversed. It may be noted that the counterbalancing weight means 25 is preferably located as far in the opposite direction relative to the plate 70 and cover member 22 as is possible to maximize the counterbalancing effect achieved with such weight.

Turning to FIGURES 6 and 7, there is shown two partial schematic sketches of a lamp incorporating the base of the instant invention, with the cover member 22 and the pipe 16 in FIGURE 7 being rotated 180 degrees. The drawings are intended to illustrate that regardless of the extent of rotation of the arm assembly and cover plate 22, the counterbalancing weight means 25 is always positioned in the most effective position with respect to the lamp fixture and assembly to prevent tipping.

FIGURE 5 is similar to FIGURE 3 and shows the common cover plate 22 which includes the integrally depending cavity 52 and housing 60 within which the swivel ball 68 is urged. Similarly, the pipe 16 is confined to pivotal movement in the plane of the paper upon which FIGURE 5 is drawn by the slot 62 longitudinally disposed along a diameter of the plate 22. The distinction between the embodiments of FIGURE 5 and FIGURE 3 is that in FIGURE 5 the intermediary plate 70a and lower plate 21a are provided with mating circular raceways 83 within which are circumferentially disposed ball-bearings 84 to permit a "lazy-susan" type of rotation between cover plate 22 and base plate 21a. Although not shown in FIGURE 5, it is to be understood that the intermediary plate 70a is secured to the interior of cover

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plate 22 in the manner similar to the securement of the plate 70 in FIGURE 3. Intermediary plate 70a carries the counterbalancing weight means 25 in exactly the same manner as was described with respect to the embodiment of FIGURE 3.

Thus there has been described a relatively simple arrangement for effectively reducing the magnitude of weight necessary to prevent tipping of a desk-top lamp fixture or in the alternative a method of increasing the moment arm of an arm assembly and lighting fixture combination while maintaining the amount of required weight as constant.

Although there has been described a preferred embodiment of the instant invention, it is to be understood that various constructional techniques may be utilized to achieve the basic operation necessary in the instant invention. For example, other types of swivel arrangements could be utilized to join the pipe 16 to the cover plate 22. Thus cover plate 22 could be completely flat with a suitable swivel joint arrangement (such as one similar to the arrangement shown in the figures) secured thereon.

Although there has been described a preferred embodiment of this novel invention, many variations and modifications will now be apparent to those skilled in the art. Therefore, this invention is to be limited, not by the specific disclosure herein, but only by the appending claims.

We claim:

1. In an assembly including a fixture and an arm assembly secured to said fixture at one end thereof, the improvement comprising a base unit having:

a first member relatively stationary with respect to a surface upon which it rests;

a second member rotatable relative to said first member, said other end of said arm assembly being secured to said second member for pivotal movement relative thereto; and

counterbalancing weight means rotatable with said second member relative to said first member for effectively counterbalancing torque developed by said fixture regardless of the extent of rotation of said second member relative to said first member;

further including a housing positioned on said second member, said housing including an elongated slot through which said other end of said arm assembly passes, said other end being pivotally movable relative to said second member in a plane defined by said slot and a vertical axis passing through the center of said second member;

wherein said slot is located off-center in a first direction relative to the center of said second member, and said fixture and said arm assembly extend generally in a second direction opposite said first direction relative to said second member; and

wherein said counterbalancing weight means is secured to said second member for rotation therewith and is positioned as far in said second direction as is possible relative to said second member.

2. The assembly of claim 1, and further including a third member interposed between said first and second member, said third member being secured to said second member for rotation therewith relative to said first member, said third member supporting said counterbalancing weight means.

3. The assembly of claim 2, wherein said first and third members include aligned raceways and further including ball-bearing means disposed in said raceways to facilitate rotation between said first and third members.

4. The assembly of claim 1, and further including ball means disposed in said housing, said ball means securely receiving said other end of said arm assembly; and biasing means for continually urging said ball means into frictional engagement with the interior surfaces of said housing.

5. The assembly of claim 4, wherein said second mem-

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ber includes a depending protrusion-receiving cavity disposed thereon, and said first member includes an upstanding protrusion which is telescopically received within said cavity to permit relative rotation therebetween about said vertical axis.

6. The assembly of claim 5, wherein said protrusion and said cavity include mismatched exterior and interior side surfaces, respectively, to minimize the area of frictional engagement between said surfaces when said protrusion is seated within said cavity.

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