Oct. 27, 1959 R. A. MULAC 2,910,310

BALL AND SOCKET SWIVEL FOR AN ELECTRIC LIGHT RECEPTACLE

Filed Dec. 6, 1957

Fig. 1.

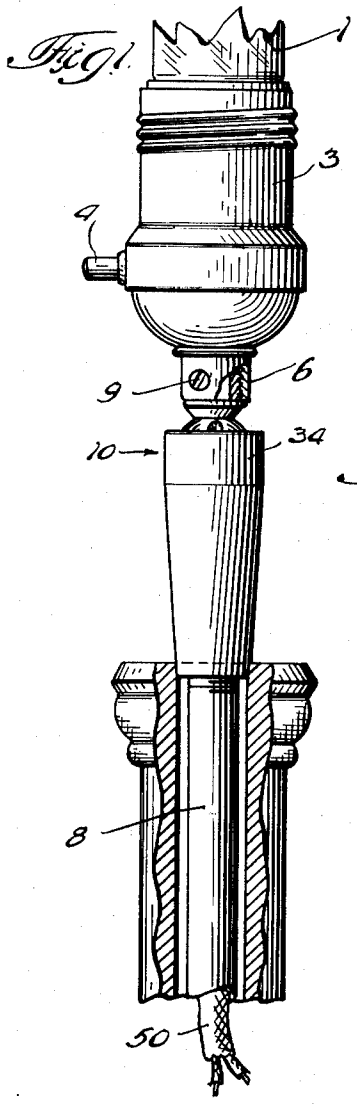


Fig. 2.

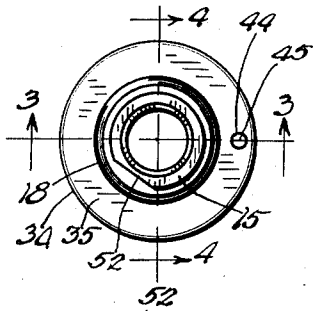


Fig. 5.

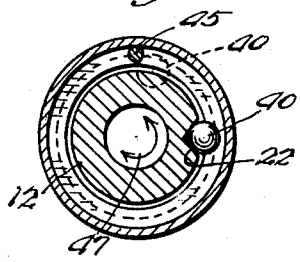


Fig. 3

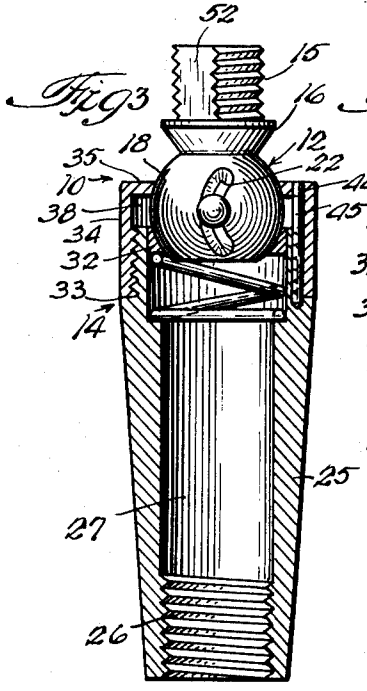
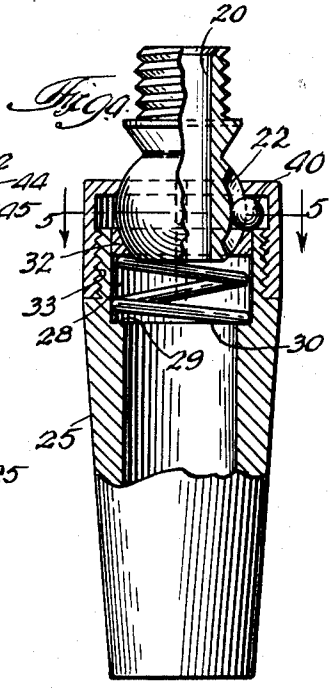


Fig. 4.



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BALL AND SOCKET SWIVEL FOR AN ELECTRIC LIGHT RECEPTACLE

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4 Claims. (Cl. 285—91)

This invention relates to a ball and socket swivel for an electric light receptacle, particularly a receptacle of the type adapted to receive a screw type base of an incandescent electric light bulb.

It is one of the objects of the present invention to provide a swivel joint which is simple and economical of construction and is so made that it can quickly and easily be interposed between an electric light receptacle and the support for the receptacle, and which will allow universal swiveling of the electric light receptacle without exposing any electrical wires at or around the swivel joint.

It is a further object of the present invention to provide a swivel joint of the above mentioned character wherein the wires for carrying electric connections to the light bulb receptacle extend lengthwise through the ball and socket connection.

It is a still further object of the present invention to provide a ball and socket mechanism of the above mentioned character that provides a screw threaded mount for receiving an electric light bulb receptacle and which is also screw threaded to provide for mounting for the ball and socket mechanism on a lamp support in such manner as to permit universal swiveling of the electric light bulb receptacle and which will also permit screwing or unscrewing of the electric light bulb receptacle on to or off of the ball and socket mechanism without requiring any special tools or the like for holding the ball and socket mechanism in position.

The attainment of the above and further objects of the present invention will be apparent from the following specification taken in conjunction with the accompanying drawings forming a part thereof.

In the drawing:

Figure 1 is a longitudinal view, in partial section, showing the mechanism of the present invention as applied between an electric light bulb receptacle and a conventional support therefor;

Figure 2 is a top plan view of the ball and socket mechanism;

Figure 3 is a longitudinal sectional view taken along the line 3—3 of Figure 2;

Figure 4 is a longitudinal sectional view taken along the line 4—4 of Figure 2 and looking in the direction of the arrows; and

Figure 5 is a sectional view taken along the line 5—5 of Figure 4.

Like figures designate like parts throughout the different figures of the drawing.

In Fig. 1 there is shown in a fragmentary manner an incandescent electric light bulb **1** having a male screw type base adapted to be threaded into a conventional electric light bulb receptacle **3** which may or may not have a switch **4** and which terminates in a female threaded neck **6** that is adapted to be threaded on to the top of a threaded type support **8**, and is to be locked in place as by a screw **9**.

The electric wires for establishing the connections within the receptacle extend into the receptacle through the support **8** and neck **6**. In the present instance, a ball and socket mechanism **10** of the present invention is interposed between the support **8** and the neck **6**.

The ball and socket mechanism includes a ball part **12** which in this instance is the upper part, and a socket forming part **14** which in this instance is the lower part.

The ball forming part **12** has an externally threaded neck **15** that terminates in an inverted frusto-conical base **16** which in turn terminates in a ball or spherical part **18**. A longitudinal bore **20** extends through the bore part **12** concentric with the axis of the threads on the neck **15**. In the periphery of the ball part **18** there is formed a groove **22** substantially V-shaped that extends along an arc which is a great circle of the sphere or ball part **18**, said great circle being centered in a plane that includes the longitudinal axis of the bore **20**. The groove **22** is of a length approximately 90 degrees along the periphery of the ball **18**, although the extent of this arc may be greater or less than 90 degrees depending upon the amount of tilting that is to be permitted to the axis of the neck **20**.

The socket part **14** of the ball and socket mechanism consists of a lower or base portion **25** that is internally threaded at its bottom at **26**. The pitch of the threads **26** is the same as the threads **15** which is the same as the pitch of the threads at the top of the support **8**. As a result of this arrangement the threads **26** may be threaded on to the support **8** for mounting the ball and socket mechanism, and the neck **6** of the electric light receptacle **3** may be threaded on the threads **15** for mounting the electric light receptacle. The base portion **25** has a longitudinal bore **27** therethrough through which are passed the electrical conductors for the electric light bulb, and has at the top thereof a counter bore **28** that provides a peripheral shoulder **29** that constitutes a seat for a spring **30**. A ring **32** is located within the counter bore **28** and constantly pressed upwardly by the spring **30**, the ring **32** being curved on the inside to coincide with the surface of the ball **18** so that the ball **18** is free to slide along the inner surface of the ring **32**. The top of the base **25** is externally threaded as indicated at **33**, to receive a female threaded cap **34** which in Figures 3 and 4, is in inverted position. The top end **35** of the cap **34** has an opening that seats on the ball **18**, said opening being of a diameter less than the diameter of the ball **18** and greater than the maximum diameter of the frusto-conical base **16**, so that the neck **15** and base **16** of the ball part **12** may be inserted through the central opening in the top end **35** of the cap **34**, the upward movement thereof being limited by the ball **18**.

When the cap **34** is screwed into position so that the bottom of the cap rests on the external peripheral shoulder **33** of the base **25**, there is an annular space **38** between the underside of the cap **34** and the top of the base **25**. This space constitutes a raceway for a ball bearing **40** that also extends into the groove **22** and is confined between the groove **22** and the groove or annular space **38**. The difference between the outside diameter of the ball **18** and the inside diameter of the cap **34** at the annular space **38** is less than the diameter of the ball bearing **40**.

After assembly of the parts thus far described, the cap **35** is drilled to form a hole **44**. This hole extends through the top **35** of the cap **34** and through the threads between the cap **34** and the base **25**. After this hole is formed, a pin **45** is driven into this hole until the top of the pin is flush with the outside surface of the top **35**.

The pin **45** serves a number of purposes. First it locks the cap **35** on to the base **25** by effectively preventing turning of the cap on the base. In addition, this pin

extends through the annular space 38 and where the pin is located and constitutes a restriction in radial extent of the annular space and limits the movement of the ball bearing 40 in the raceway 38. If an attempt is made to turn the ball part 12 in either direction as indicated by the arrows 47 in Figure 5, the permissible turning is limited to an amount slightly less than 360 degrees from the dotted line position illustrated in Figure 5.

The spring 30 constantly urges the ring 32 and with it the ball 18, in an upward direction and thus creates a pressure engagement between the ball 18 and the bore in the top 35 through which the ball extends. This pressure engagement creates enough friction between the members so that the ball 18 remains in any position to which it has been moved, while permitting adjustment of the ball against the frictional resistance.

The electric wires for extending the electric connections to the light bulb receptacle 3 are indicated at 50. Those wires extend through the support 8 and through the bore 27 in the base 25, thence through the bore 20 in the ball part 12 and through the neck 6 and into the receptacle. The receptacle may be locked against turning in the usual manner as by providing a flat 52 on the outside of the neck 15 which flat receives the end of the screw 9.

From the above description it is clear that the provision of the pin 45 which passes through the annular space 38 limits the rotation of the ball member in a direction axially of the neck 15 and thus permits unthreading of the electric bulb light receptacle when that is necessary, of course the screw 9 being first loosened.

In compliance with the requirements of the patent statutes, I have here shown and described a preferred embodiment of the present invention. It is, however, to be understood that the invention is not limited to the precise construction here shown, the same being merely illustrative of the principles of the invention.

What I consider new and desire to secure by Letters Patent is:

1. A ball and socket mechanism for an electric light receptacle, said mechanism being threaded at one end for threaded engagement with the neck of the receptacle and having a ball and socket connection between its two ends and a continuous bore therethrough from end to end for the passage of electrical conductors therethrough, the mechanism including a ball part and a socket part, the two parts having universal angular adjustment with respect to one another, yielding means maintaining the two in frictional pressure engagement whereby the two are held by friction in their adjusted positions, the ball part having a groove formed in its outer surface and the socket part having a groove formed in a surface thereof opposite the ball surface, the two grooves crossing one another, a ball bearing in both of the grooves at the crossing, one of the grooves extending through an arc of 360 degrees, and a pin extending across and intersecting the one groove and constituting a stop for the ball whereby abutment of the ball bearing with the pin limits the turning of the ball and socket joint about the center axis of said one groove to an amount less than 360 degrees, the socket part comprising two threadingly engaged pieces adapted to receive the ball end between them, said pin also extending through the two pieces of the socket part and holding them against separation.

2. A ball and socket mechanism for an electric light receptacle, said mechanism being threaded at one end for threaded engagement with the neck of the receptacle and having a ball and socket connection between its two ends and a continuous bore therethrough from end to end for the passage of electrical conductors therethrough, the mechanism including a ball part and a socket part, the two parts having universal angular adjustment with respect to one another, yielding means maintaining the two in frictional pressure engagement whereby the two are held by friction in their adjusted positions, the ball part having a groove formed in its outer surface and the socket part having a groove formed in a surface thereof opposite the ball surface, the two grooves crossing one another, a ball bearing in both of the grooves at the crossing, one of the grooves extending through an arc of 360 degrees, and a pin extending across and intersecting the one groove and constituting a stop for the ball whereby abutment of the ball bearing with the pin limits the turning of the ball and socket joint about the center axis of said one groove to an amount less than 360 degrees.

3. A ball and socket mechanism comprising a ball part and a socket part, said two parts having universal angular adjustment with respect to one another, yielding means maintaining the two parts in frictional pressure engagement whereby the two are held by friction in their adjusted positions, the ball part having a groove formed in its outer surface and the socket part having a groove in a surface opposite the ball surface, the two grooves crossing one another, a ball bearing in both of said grooves at the crossing, said ball part being rotatable about the center axis of the groove in said socket part, and stop-forming means located in the groove in said socket whereby abutment of the ball bearing with said means limits the rotation of the ball part about said center axis.

4. A ball and socket mechanism for an electric light receptacle, said mechanism being threaded at one end for threaded engagement with the neck of the receptacle and having a ball and socket connection between its two ends and a continuous bore therethrough from end to end for the passage of electrical conductors therethrough, the mechanism including a ball part and a socket part, the two parts having universal angular adjustment with respect to one another, yielding means maintaining the two in frictional pressure engagement whereby the two are held by friction in their adjusted positions, the ball part having a groove formed in its outer surface and the socket part having a groove formed in a surface thereof opposite the ball surface, the two grooves crossing one another, a ball bearing in both of the grooves at the crossing, one of the grooves extending through an arc of 360 degrees, and means in the one groove and constituting a stop for the ball whereby abutment of the ball bearing thereagainst limits the turning of the ball and socket joint about the center axis of said one grove.

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