

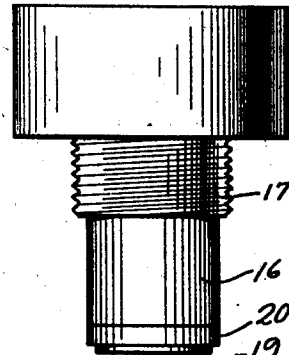
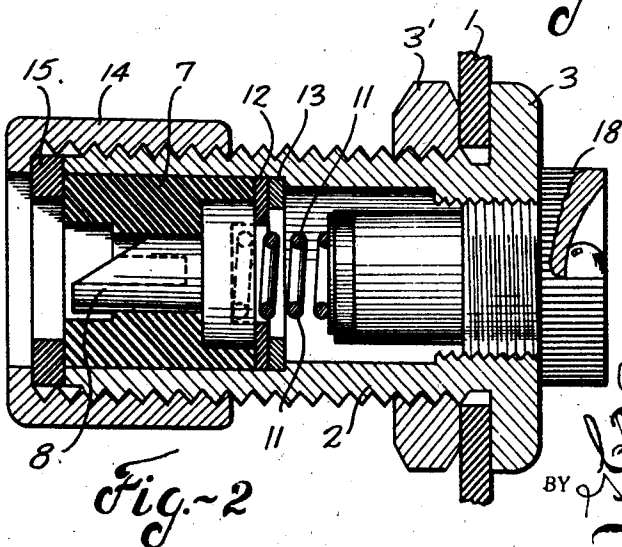
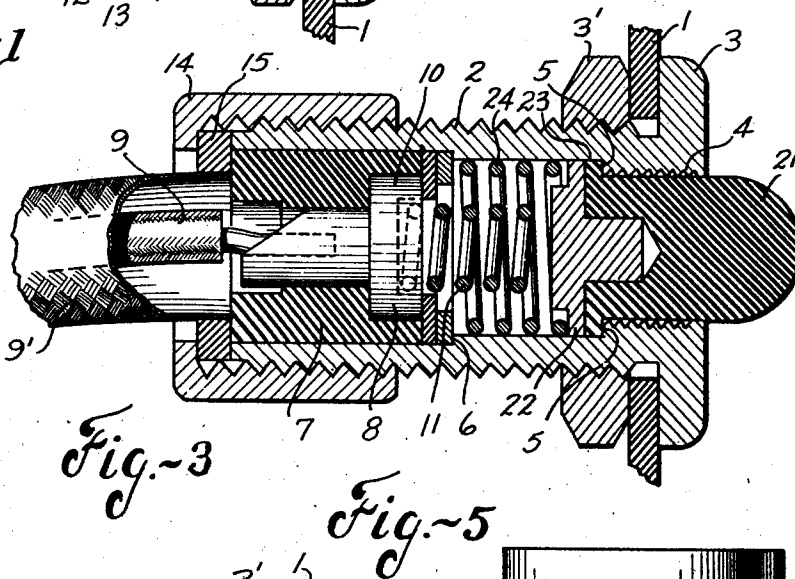
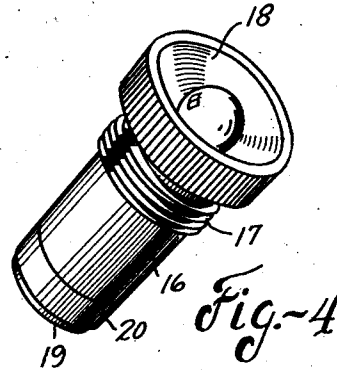
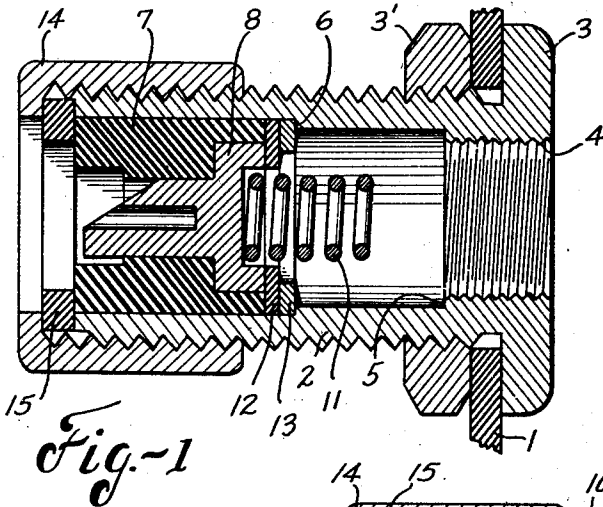
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2,440,288

ELECTRICAL SOCKET

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ELECTRICAL SOCKET

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The invention described herein may be manufactured and used by or for Government for governmental purposes, without the payment to us of any royalty thereon.

This invention pertains to electrical connectors, and more particularly to a dual purpose socket of universal character capable of being interchangeably used as a mounting for a signal or warning lamp or for a push button by which either said member may be correctly introduced into an electrical circuit.

The instant socket is designed for instrument panel mounting, and especially for airplane use, wherein it may be utilized to electrically mount any one of a plurality of electrically energized signals, indicators, meters and other units.

For airplane use it is highly desirable that the number of necessary replacement parts be kept at minimum, and that the necessary parts be applicable to different uses. The present invention enables a single type of electrical socket to be used as a replacement mount for various different units.

While the present multi-purpose socket is herein described and illustrated as optionally applicable as a signal lamp and push button mounting, it is to be understood that it is not limited thereto, but may be utilized as a mount for a wide range of other electrical members and connections.

The object of the invention is to improve the construction as well as the means and mode of operation of electrical sockets whereby they may not only be economically constructed, but will be more efficient in use, of universal character, have a wide range of application for different purposes and as a mount for different units, and be unlikely to get out of repair.

A further object of the invention is to provide a socket having self cleaning electrical contacts, and which is readily assembled and disassembled without the necessity of tools.

A further object of the invention is to provide an electrical socket mounting which readily accommodates itself to different purposes, and which will universally accommodate various associate units.

A further object of the invention is to provide an electrical socket having the advantageous structural features and inherent meritorious characteristics and the mode of operation, herein set forth.

Further purposes of the invention are to enable the interchangeable units to be readily removed and replaced and good electrical contact

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thereof maintained even though not tightly engaged or when partially loosened by vibration or shock and accidental loosening resisted by the reaction of a resilient electrical contact.

With the above primary and other incidental objects in view as will more fully appear in the specification, the invention intended to be protected by Letters Patent consists of the features of construction, the parts and combinations thereof, and the mode of operation, or their equivalents, as hereinafter described or illustrated in the accompanying drawings.

In the drawings wherein is illustrated the preferred but obviously not necessarily the only form of embodiment of the invention,

Fig. 1 is an axial sectional view of an assembled electrical socket embodying the present invention.

Fig. 2 is a similar sectional view showing the present electrical socket with an electrical signal lamp mounted therein.

Fig. 3 is a similar view of the socket assembly in which a push button is mounted.

Fig. 4 is a perspective view of the signal lamp unit removed from the socket.

Fig. 5 is a side elevation of a substitute unit, such as a meter, indicator or gage which may be connected into an electrical circuit by insertion in the present socket by substitution for a signal lamp.

Like parts are indicated by similar characters of reference throughout the several views.

For airplane use, the present socket is ordinarily miniature size. The accompanying drawings illustrate it on an enlarged scale. However, the socket may be made of any suitable size, commensurate with the conditions and purpose of its use.

Referring to the drawings, 1 is a portion of the mounting panel or support within a hole in which the socket is mounted.

The device comprises an externally screw threaded barrel or sleeve 2 having a peripherally flanged head 3 for engagement with the mounting panel 1 to which it is secured by a clamp collar 3' screw threaded upon the exterior of the barrel 2. At its head end the barrel or sleeve 2 has a somewhat reduced, internally screw threaded opening 4. Within the sleeve or barrel 2 adjacent the internally threaded portion 4 is an internal seat or shoulder 5. At mid length the barrel or sleeve 2 is counterbored to afford a second internal seat or shoulder 6.

Inserted within the larger end of the barrel or sleeve 2, is a counterbored sleeve 7 of insulating or dielectric material, within which is seated an

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electroconductive terminal member 8 to which is connected an electrical conductor 9. The terminal 8 has an enlarged recessed head 10 to which is affixed by soldering or the like, a helical contact spring 11 of materially less diameter than the interior of the sleeve 2.

Interposed between the internal shoulder 6 and the insulating sleeve 7 and overhanging the enlarged head 10 of the terminal member 8 is a collar 12 of insulating material on which is superposed a metallic collar 13 preferably of brass.

The assembly of the insulating body 7, the terminal member 8 with its attached spring 11 and the collars 12 and 13 are clamped against the medial seat 6 by a cap or inwardly flanged collar 14 screw threaded upon the end of the sleeve or barrel opposite the head 3. Interiorly of the flanged collar 14 and bearing upon the end of the insulating body 7 is preferably interposed a metallic ring or collar 15 to which may be attached a woven metallic shielding cable 9' surrounding the conductor 9.

Detachably engageable in the screw threaded opening 4 of the socket, is a lamp unit shown in Fig. 4 comprising an elongated body portion 16, screw threaded at 17 for engagement in the threaded opening 4 of the socket. At one end the lamp unit is provided with an enlarged concave head 18 recessed to receive a lamp element. One terminal of the filament of the lamp is grounded on the body portion 16, and the other terminal thereof is connected with a contact disc 19 on the end of the lamp body 16 but insulated therefrom by an interposed portion 20 of insulating material.

When the lamp unit is inserted through the screw threaded opening 4 and engaged therein with the screw threads 17, the terminal contact disc 19 of the unit directly engages the end of the helical spring 11 and subjects the spring to pressure. Axial compression of the spring 11 while the lamp unit is being inserted causes sufficient wiping action of the spring to insure a clean contact area.

In lieu of the lamp unit, the socket assembly may be utilized as a mount for a push button to close the electrical circuit in which the socket is connected. In such event a peripherally flanged plunger 21 having at its inner end a metallic contact face 22 is substituted for the lamp unit. The plunger 21 is inserted from the rear end of the socket upon removal of the cap 14 and the inserted body 7 of insulating material.

The button plunger 21 projects through the screw threaded opening 4, and is limited in its outward movement by engagement of its peripheral flange 23 with the internal shoulder 5 of the socket. The screw threads within the opening 4 perform no function when the push button plunger is inserted therein, neither do they in any way interfere with its operation. A helical spring 24 having a diameter substantially equal to the interior diameter of the mounting sleeve 2 is interposed between the metallic collar 13 and the electro-conductive contact face 22 of the push button plunger 21 in concentric spaced relation with the contact spring 11. The larger spring 24 by its reaction normally maintains the push button plunger projected outwardly with its peripheral flange in engagement with the stop shoulder 5 and its electro conductive contact face out of engagement with the inner contact spring 11. The latter is of such length, that normally the contact surface 22 of the push button plunger is spaced away therefrom. The larger spring 24 is always in electrical engagement with the plunger

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er contact surface 22 and is likewise always in electrical communication with the mounting sleeve 2. The spring 24 is preferably of such size that as it is compressed its convolutions will wipe the interior surface of the sleeve to maintain clean contact surfaces on the spring and on the sleeve 2. The end of the spring 24 tends to turn under compression causing a similar wiping engagement of the spring with the contact face 22 of the plunger. A like wiping action is effected between the inner end of the spring and the electro conductive collar 13 which is clamped in tight engagement with the shoulder 6 of the mounting sleeve. Thus the button plunger face 22 is assured good electrical grounding at all times on the mount sleeve 2. When the plunger 21 is depressed against the tension of its retracting spring 24, the contact face 22 directly engages with the free end of the inner spring 11. By pressure thereon the contact spring 11 also tends to turn slightly, but sufficiently to afford wiping engagement which assures clean contact surfaces between the spring 11 and the plunger contact face 22.

When depressed into engagement with the contact spring 11, the contact face 22 completes electrical connection from the conductor 9, through the terminal 8 and spring 11 and thence through the contact surface 22 to the spring 24 to the mounting sleeve 2 upon which the spring 24 is grounded.

In practice the spring 24 may be made a permanent part of the socket, and retained therein ready for use whenever a push button is to be substituted for a lamp. Otherwise it may be a separate element to be inserted only when the push button plunger is to be mounted in the socket.

While the universal adaptability of the socket to a push button and a lamp has been described, it is to be understood that the same socket may be utilized for mounting of other devices. For example, there is shown in Fig. 5 a meter, an indicator or other electrically energized unit 25 to which is attached to the same body 16 having screw threads 17, which is otherwise utilized as a signal lamp support. Such substitute meter or indicatory unit 25 or the like, shown in Fig. 5 may be readily substituted for the lamp unit or push button assembly, in which case the terminal contact 19 of the substitute unit will electrically engage the contact spring 11 and the body of the substitute unit will be grounded upon the mount sleeve through the screw threads 17 as when the lamp unit is inserted to complete the electrical circuit through the substitute unit.

Cross reference is made to copending application, Serial No. 479,870, filed March 20, 1943, now Patent No. 2,361,412, issued October 31, 1944, the benefit of the filing date of which is claimed as to all common subject matter.

The present type of universal socket enables interchangeable units, including gages, meters, indicators or lamps to be readily interchanged for each other in an electrical circuit without the use of tools and from the front of a mounting panel without necessity of dismantling the socket or disturbing its connections. The helical contact spring 11 may be tapered or conical as desired. It is preferably of such length that it is engaged and placed under tension by the initial engagement of the lamp or other unit with the screw threads within the bore 4, and as the unit is screwed tight such tension is increased. The engagement of the unit terminal 19 with the contact spring 11 under tension, as the unit is being tight-

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ened in the screw threaded bore 4 facilitates the wiping action by which the contacting surfaces are cleaned and good electrical engagement maintained. The reaction of the contact spring 11 under such tension maintains electrical contact with the unit and the latter with the screw threads of the socket so long as sufficient engagement with the screw threads exists to maintain the unit in position, even though it may have been loosened by vibration or shock. Reaction of the contact spring 11 exerts sufficient pressure upon the screw threads of the interchangeable unit, against those of the bore 4, to increase their frictional resistance, which together with the frictional pressure of the contact spring on the contact 19 resists and retards loosening rotation of the unit under influence of vibration or shock.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific features shown, but that the means and construction herein disclosed comprise the preferred form of several modes of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described our invention, we claim:

1. As an article of manufacture, an electrical socket with which are interchangeably engageable, a lamp unit or a push button element, including a one piece metallic mounting sleeve, an internal shoulder within the sleeve forming a stop for a spring actuated reciprocatory push button having a peripheral shoulder thereon overlapping and engaging the internal stop shoulder, an internally screw threaded bore therein adjacent to the internal shoulder within which a lamp element is detachably engageable alternately with the push button, a helical axially disposed contact spring engageable with the lamp element or push button enclosed within the sleeve and insulated therefrom with which electrical contact surfaces upon the lamp element or the push button are respectively engageable, the lamp element or contact surface of the push button being otherwise grounded upon the mounting sleeve.

2. An electrical socket, comprising an exteriorly threaded tubular barrel, a flanged head thereon, a clamp collar threaded upon the exterior of the barrel cooperating with the flanged head to secure the socket in a mounting support, an internally screw threaded portion in the head end of the tubular barrel to receive a lamp unit, an internal shoulder within the bore of the sleeve adjacent to the threaded portion to afford a stop for a spring retracted push button projecting through the threaded portions of the barrel in lieu of the lamp unit, an electro conductive helical contact spring within the barrel and insulated therefrom projecting toward the screw threaded portion of the barrel for optional engagement therewith of either the lamp unit or push button when mounted in the internally threaded portion of said barrel.

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3. An electrical socket for optional mounting therein of an electrical lamp unit or a spring retracted reciprocatory push button, including a tubular mounting sleeve, interiorly screw threaded at one end for detachable engagement therein of a correspondingly screw threaded lamp unit, an internal shoulder within the sleeve adjacent the internally screw threaded portion thereof to form a limiting stop in one direction for a reciprocatory push button projecting through the screw threaded portion of the bore and having an electro conductive contact face at its inner end, and an electrical contact within the tubular sleeve and insulated therefrom, said contact being in the path of insertion of the lamp unit or path of reciprocation of the push button and engageable therewith at the inner limit of their adjustment relative to the sleeve to thereby complete an electrical circuit, the lamp unit or the contact face of the push button when mounted in said sleeve being otherwise grounded on the sleeve.

4. An electrical socket, having a counter bore therein, the portion of smaller diameter thereof being screw threaded to agree with a lamp element detachably engageable therein, a reciprocatory push button mounted in the screw threaded portion of the bore, a peripheral flange upon the push button, an internal shoulder within the bore of said socket with which the peripheral flange of the push button is engageable to limit its outward movement, a helical spring within the bore against which the push button is depressible within the screw threaded portion of the bore, an electro conductive surface upon the inner terminal face of the push button, an electro conductive helical spring disposed axially within the bore of the socket in concentric spaced relation with the push button retracting spring, with which the electro conductive surface of the push button makes contact at the inner limit of range of reciprocatory movement of the push button against the yielding resistance of its retractile spring.

5. An electrical socket, including a counter-bored sleeve, the portion of the bore of smaller diameter being internally screw threaded, an internal shoulder within the bore beyond the inner end of the screw threaded portion of the bore, and a helical contact spring axially disposed within the sleeve and insulated therefrom, in axially spaced relation with the screw threaded portion of the bore and the internal shoulder.

6. An electrical socket, including a mounting sleeve, means for detachably engaging a lamp unit within the bore of the sleeve, means for limiting in one direction the reciprocatory movement of a spring retracted push button when mounted in the bore of the sleeve in lieu of a lamp unit, and an electrical contact member within the bore of the sleeve in axial alignment with the lamp engaging means and insulated therefrom with which either the lamp unit or an electroconductive surface of the push button is operatively engageable.

7. An electrical socket, including an externally screw threaded counterbored sleeve, a peripherally flanged head at one end of the sleeve, a clamp collar screw threaded upon the sleeve for cooperation with the flanged head to secure the sleeve to a mounting panel, an internally flanged collar screw threaded upon the sleeve at its end opposite its peripherally flanged head, the portion of the counterbore of said sleeve of smaller diameter being internally threaded, an internal shoulder formed by the counterbore adjacent the in-

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ner end of the screw threaded portion, a sleeve of insulating material within the screw threaded sleeve, an internal shoulder within the counter-bore against which the sleeve of insulating material is clamped by the internally flanged collar screw thread on the sleeve, an electroconductive core extending through the sleeve of insulating material, a helical electroconductive spring contact connected with said core and extending axially within the bore of the sleeve toward the internally screw threaded portion thereof.

8. An electrical socket in which one of a plurality of interchangeable members may be adjustably mounted, including a tubular mounting sleeve internally screw threaded at one end thereof, an internal peripheral shoulder in proximate relation with the screw threaded portion, a helical contact spring axially disposed within the sleeve, a body of insulating material electrically isolating the contact spring from the mounting sleeve, said contact spring making contact with an optionally selected member of the plurality of interchangeable members mountable within said screw threaded portion of the sleeve to electrically connect the spring with the mounting sleeve, when the selected member is at the inner limit of its adjustment.

9. An exteriorly screw threaded mounting sleeve, a peripherally flanged head at one end thereof, a clamp collar engageable with the exterior screw threads thereof adjacent the peripheral flange of the sleeve to secure the sleeve to a support, an internally screw threaded bore at the end of the sleeve having the peripherally flanged head to receive any one of a plurality of interchangeable members, a body of insulating material within the opposite end of the sleeve, an electrically conductive core within said insulating body, a helical contact spring projecting from said core in axial relation with the sleeve and engageable by any of the interchangeable members receivable within the internally screw threaded portion of the bore.

10. An electrical socket, including a mounting sleeve, internal screw threads and an internal peripheral shoulder therein alternately engageable with optionally selected members of a plurality of interchangeable members to be mounted and common to said socket, insertable therein, a pair of concentrically disposed helical conductor springs within the sleeve, a body of insulating material insulating the inner concentric helical spring from the outer concentric spring and from the mounting sleeve, an electrical conductor connected to the inner concentric spring, the construction and arrangement being such that at the inner limit of its insertion into said socket the selected interchangeable member electrically engages the inner concentric spring to electrically connect the conductor and said inner concentric spring with the mounting sleeve, through at least a portion of the inserted member.

11. An electrical socket wherein one of a plurality of screw threaded interchangeable units is

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removably engageable within a screw threaded bore of a tubular mounting, including a yielding spring contact member centrally located within the tubular mount with which the insertable unit is engageable under pressure coincident with the initial engagement of the interchangeable unit within the screw threaded bore of the mount, and the yielding resistance thereof increased by further adjustment of the unit within the screw threaded bore, the construction and arrangement being such that the reaction of the yielding spring contact under pressure will maintain electrical contact with the unit so long as the latter is sufficiently engaged with the screw threads of the tubular mount to maintain its position, and will resist loosening of the unit in the screw threads under influence of vibration and shock.

12. An electrical socket wherein a tubular mount is provided with a screw threaded bore to removably receive an electrical unit insertable therein, including a yielding spring electrical terminal centrally located in the path of the inserted unit and engageable thereby upon the initial engagement of the unit within the screw threaded bore and subjected to increased tension by the further adjustment of the unit therein, the construction and arrangement being such that the electrical spring terminal will maintain electrical contact with the unit until the latter is entirely disengaged from the screw threads within the bore, and the reaction of the electrical spring terminal will impose sufficient frictional pressure upon the interengaging screw threads of the unit and bore of the mount to resist loosening effect of vibration or shock.

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