

"Electric Plugs"

Description of Invention

This invention is concerned with improvements relating to electric plugs, particularly of the kind (hereinafter referred to as being of the kind specified) comprising a body and three plug pins, namely an earth pin, a live pin and neutral pin, extending from the interior of the body to which electric wiring is or may be connected internally of the body.

A problem occurs in relation to electric plugs of larger size, in that when the plug is inadvertently dropped, damage to the pins, or to parts of the housing bounding the apertures through which the pins extend into the housing, may occur. This invention has been devised specifically in relation to larger plugs, including multiple socket adaptors, timers, thermostats, security or protection devices, in which the problem of damage is most prevalent. It is however to be appreciated that the invention may be used to advantage in conventional, smaller single plugs.

According to this invention there is provided an electric plug of the kind specified, wherein one at least of the pins is mounted so as to be capable of at least limited movement against a resilient restraint.

Preferably two of the pins are so mounted as to be capable of at least limited movement against a resilient restraint, preferably the live and neutral pins, since being smaller than the earth pin these are more prone to damage. If desired however the earth pin may also be so mounted, since whilst the earth pin is less likely to be damaged in itself, it may on being struck, cause damage to the parts of the housing bounding the aperture through which the pin extends.

Preferably the resilient mounting is effected by the application of a resilient force against part of the pin (conveniently a part of the pin within the housing) permitting some degree of tilting or pivotal movement of the pin.

Since a conventional plug pin is of oblong cross-section, and is less likely to be damaged by the application of shock loading in a direction parallel to the larger cross-sectional dimension, preferably movement

permitted by the resilient restraint is in a direction parallel to the smaller cross-sectional dimension. It is however envisaged that in certain circumstances it may be desired to provide for the capability of such limited movement in two mutually perpendicular directions, each direction being at right angles to the length of the pin.

Preferably the resilient force acts against the pin the urge part of the pin internally of the housing against a fixed abutment or shoulder provided by the plug body. In this manner, should the pin be struck in one direction, it may pivot about a first axis to cause compression of the resilient force, and should it be struck in an opposite direction it may pivot about a second axis to cause compression of the resilient force.

The clearance provided for the pins in the pin apertures is desirably only slightly larger than the clearance provided in a conventional plug, if at all.

The resilient force may be provided with a buffer of a resilient material such as rubber, or spring means, which may be a leaf spring or a coil spring.

Advantageously the resilience is such as to permit the pin to deform not more than about 3 degrees from its rest position under the steady application of a load of approximately 450 grams at a point 25 mm from the face of the plug, preferably between 1 and 2 degrees from its rest position, under the steady application of a load of between 450 and 1000 grams.

There will now be given a detailed description, to be read with reference to the accompanying drawings, of three plugs which are preferred embodiments of this invention, having been selected for the purposes of illustrating the invention by way of example.

In the accompanying drawings:

FIGURE 1 is a schematic view of part of the plug which is the first embodiment of this invention; and

FIGURES 2 and 3 are modifications of the first embodiment.

The electric plug which is the first embodiment of this invention is specifically an electric plug of the kind specified, comprising a housing 6 provided with apertures through which an earth pin 8 and two live and neutral pins, only one, 10 of which is shown, extend. Internally of the plug the pins are connected to electric wiring in conventional manner, also not shown.

The electric plug which is the first embodiment of this invention is a larger size of plug, as is commonly found in multiple socket adaptors, timers,

thermostats, security or protection devices, and is in consequence significantly heavier than a conventional simple plug. Such larger plugs, when inadvertently dropped, may be damaged by impact forces acting against the pins, particularly the live and neutral pins, and particularly in directions parallel to their dimensions of smaller cross-section. Such impact may prevent the plug from being used, or more seriously may cause damage which renders the plug unsafe to use.

In the first embodiment both the live and neutral pins extend through an aperture 12 which is slightly larger than would conventionally be provided for a simple sliding fit. Internally of the housing a shoulder portion 14 of the pin is urged into engagement with an abutment 16 provided by a cover of the housing by a compression spring 18. The compression spring resiliently urges the shoulder 14 into engagement with the abutment 16 under a resilient force of a magnitude such that, by the application of a transverse loading to the pin 10 of 750 grams, the pin would deflect at an angle of about 1 degree.

Thus, should the plug which is the first embodiment of this invention be inadvertently dropped, and the pin 10 struck with a blow in the direction of the arrow A of Figure 1, some of the impact forces will be absorbed by a pivoting movement of the pin 10 about the point B, momentarily compressing the resilient spring 18, before the pin is returned to its operative position.

In the event that the pin is subjected to a force in the opposite direction X, the pin will pivot about a point Y, similarly causing momentary compression of the spring 18.

As will be seen in the first embodiment, the live and neutral pins are urged by the resilient restraint in directions transverse to their longer cross-sectional dimension, i.e. at right angles to the line between the two pins, since this has been found to be the circumstance of major cause to damage when a plug of the heavier type is inadvertently dropped. It is however to be appreciated that similar resilient restraint to movement of the pins at regions thereof within the plug housing, in transverse directions (that is, in directions parallel to the major cross-sectional dimension of the pins) may be provided to permit resilient movement of the pins when subjected to an impact in a direction at right angles to the plane of the drawing of Figure 1.

In the second embodiment illustrated in Figure 2, a buffer in the form of a leaf spring 20 is provided to effect the resilient restraint to movement

of each pin, and in the third embodiment seen in Figure 3 the resilient restraint is provided by a member 22 of resilient material, such as rubber.

CLAIMS:

1. An electric plug of the kind specified wherein to reduce damage on impact, one at least of the pins is mounted so as to be capable of at least limited movement against a resilient restraint.
1. An electric plug according to Claim 1 wherein two of the pins are so mounted as to be capable of at least limited movement against a respective resilient restraints.
3. An electric plug according to Claim 2 wherein said two pins are the live and neutral pins.
4. An electric plug according to any one of the preceding claims wherein the pins are oblong in cross-section and the or each pin which is capable of limited movement against a resilient restraint is capable of such movement in a direction parallel to the smaller cross-sectional dimension.
5. An electric plug according to any one of the preceding claims wherein the resilient mounting is effected by the application of a resilient force against which part of the pin within the housing moves.
6. An electric plug according to any one of the preceding claims wherein said resilient force acts to urge part of the pin internally of the housing against a fixed abutment.
7. A plug according to any one of the preceding claims wherein the resilient force is provided with a buffer of a resilient material.
8. An electric plug according to any one of Claims 1 to 6 wherein the resilient force is provided by a spring.
9. An electric plug according to any one of the preceding claims wherein the resilience provided by the resilient restraint is such as to permit the pin



to deflect between 1 and 2 degrees under the application of a steady transverse load of 1000 grams.

10. An electric plug constructed and arranged substantially as hereinbefore described with reference to any of the accompanying drawings.

---

