

Description

The present invention relates to an electrical socket having at least two socket contacts for connections with two or more pin contacts of a plug and a shutter for closing plug pin openings in the front wall of the socket to cover two of the contacts in the absence of the plug (see for example NL-A-11363).

It is common to provide such a socket wherein the shutter closes the live and neutral openings in the socket, the shutter being movable to the open position by means of a part having a ramped surface which extends to the earth opening. The earth pin on insertion acts on the ramped surface to urge the shutter away from the openings. A spring then closes the shutter when the plug is removed. These shutters are simple to open by merely inserting a probe into the earth hole.

It is an object of the invention to make such a socket safer. Accordingly an electrical socket according to the invention has at least two socket contacts for connection with two or more pin contacts of a plug and a shutter for closing plug pin openings in a front wall of the socket to cover two of the contacts in the absence of the plug, wherein the shutter is latched in the closed position by means of at least a first latch operable by means of a plug earth pin or protrusion from a plug other than the live and neutral pins of said plug, and is characterised in that the first latch is formed as at least one latching member extending from the shutter which is pushed to one side by the earth pin or protrusion in a lateral direction as between the live and neutral pins so as to release the member from a stop.

The shutter is preferably formed with at least one lateral ramped portion to close the live and neutral openings and wherein the latching member(s) extend from the lateral portion or portions, the shutter being urged into the closed position by a spring. In order to make the shutter even safer the lateral portion may itself be provided with a second latch which requires simultaneous pressure by the live and neutral pins on the lateral portion to unlatch before the shutter can be moved in a direction from the earth pin towards the live and neutral pins.

An embodiments of the invention will now be described with reference to the accompanying drawings in which:-

Figure 1 is a plan view of part of a socket according to the invention showing openings in the front wall of the socket according to a first embodiment of the invention,

Figure 2 is a cross sectional view of the socket of Figure 1 taken on BB as seen from A in Fig. 1,

Figure 3 is a cross sectional view of the socket of Figure 1 taken on CC in Figure 1,

Figure 3A shows a second embodiment with a sim-

ilar view to the shutter of Fig. 3,

Figures 4 to 6 are plan views of the movement of the shutter seen in Figure 1 from a first position in Figure 4 in which no plug or pins are inserted, a second position Figure 5 in which the earth pin of a three pin plug is inserted and a third position in Figure 6 in which all plug pins are inserted,

Figure 7 is a perspective view of a shutter of a third embodiment of the invention,

Figure 8 is a plan view of the shutter of Fig. 7 in a similar view to Fig. 1, and

Figure 9 to 11 are plan views of the shutter seen in Fig. 8 and correspond respectively to the movements of the shutter shown in Figs 4 to 6.

In Figures 1 to 3 a socket 1 is shown with a front wall 2 and in Figure 3 a British Standard three pin plug 3 is shown half in socket 1. It should be noted in this respect that although the arrangement is specifically designed for a British standard three pin plug having an earth pin 4, a line 5 and a neutral pin 6, the earth pin can be replaced by a suitable protrusion from a plug where only live and neutral pins are provided. Whilst rectangular pins are shown these may equally be round pins or have any other suitable shape.

The front wall 2 has plug pin openings 14, 15 and 16 for pins 4, 5 and 6 respectively. Socket contacts for the pins are not shown.

Below the front wall 2 within the socket is a shutter 20 which is latched in the closed position shown in Fig. 1 and Fig. 4 by means of a first latch comprising a pair of opposed latching members formed as hooks 21 and a fixed stop 22. The hooks 21 which face each other are each formed as an end portion of a resilient flat web 23 extending from lateral ramped portions 25 which when the shutter is closed lie immediately below and close off openings 15 and 16. Lateral portions or latching faces 25 are formed on laterally extending arms 27 which are normally inclined slightly upwards to latching edges 29.

Latching edges 29 latch into latching grooves 31 formed in the inner surface of the front wall 2 adjacent to openings 15 and 16 to form a second latch.

The hooks 21 are provided with upper chamfered edges 19 and vertical chamfered edges 18.

Extending from a lower laterally extending web 32 which connects arms 27 is a projection 33 onto which a coiled compression spring 34 acts. Spring 34 acts to urge the shutter into the closed position shown in Fig. 1. Each arm 27 has a depressed circular area 50 if required, which if a two pin standard plug were inserted into openings 15 and 16 would catch the pins and prevent movement of the shutter away from openings 15 and 16 even if an object is inserted into opening 14 in order to release the first latch.

When plug 3 is inserted into the socket 1 the earth pin 4 first acts on hook chamfers 19 to force the hooks 21 apart. These clear stop 22 as shown in Fig. 5. The shorter live and neutral pins 5 and 6 then act on ramped portions 25 of the shutter arms 27 to force the arms and arm edges 29 downwards to a broken line position shown in Fig. 2 at 40. The edges 29 are then unlatched and clear of grooves 31. Further insertion of pins 5 and 6 cause the shutter 20 to move away from opening 14 opening holes 15 and 16 to allow the pins to fully enter openings 14, 15 and 16 as shown in Fig. 6 when the plug is fully inserted the shutter assumes its original shape as shown in unbroken lines in Fig. 2. This is enabled by a sloping inner surface 36 of front wall 2 shown in Fig. 3.

When the plug is removed the shutter 20 is driven back by spring 34. The arms or wings 27 and hooks 21 relatch to lock the shutter in its closed position.

The stop 22 has recesses 35 to receive the hooks 21 in a position as shown in Fig. 6 where the opening 15 and 16 in the front wall 2 of the socket are unshuttered. These recesses 35 then allow the latching members, that is the hooks, to return in the lateral direction as between openings 15 and 16 to the situation shown in Fig. 4 before the hooks are released from the stop 22.

Central web 32 from which arms 27 extend and whereby the arms are mounted to the shutter is resilient so that the arms are resiliently urged upwards towards the outer surface of the front wall 2 into grooves 31.

Fig 3A shows a second embodiment which is a slightly modified arrangement of the shutter of Fig. 3 in which the spring 34' engages in a recess 35 formed between webs 23' of the hooks 21' and central web 32'. This enables the shutter arrangement to be more compact.

It should be noted that it is possible to provide only one hook 21 or 21' though this may not be so effective as a pair of hooks.

Figures 7 to 8 show a third embodiment in which a shutter 120 operates to open openings 115 and 116 in a direction X opposite to that in the first embodiment shown in Figs 1 to 6. There are certain advantages in this arrangement as will be discussed.

The shutter 120 is formed with arms 127 similar to arms 27 of the first embodiment except that their lateral ramped portions 125 face away from the earth pin. The latching members 121 which act similarly to members 21 of the first embodiment are moved laterally outward by the earth pin 104 on initial insertion of the plug. This enables the members to clear stop 122 (see Fig. 10). Further depression of the plug results in live and neutral pins 105 and 106 acting on ramped portions 125. The arms 127 are then depressed to release the arms against the resilience of central web 132 from grooves (not shown) equivalent to grooves 31 of the first embodiment. The interaction of pins 105 and 106 and portions 125 then causes the shutter to move towards the earth pin in direction X against spring 134 which is located between the members 121 and between fixed stop 151 formed as

part of the plug moulding and end wall 152 of the shutter. The shutter with members 121 unlatched from stop 122 moves to the position shown in Fig. 11 where the members return by means of their resilience to their central position with the chamfered end portions 119 lying in recesses 135 in stop 122.

The third embodiment also has depressed circular areas 150 similar in purpose and form to those of the first embodiment shown at 50. The third embodiment has an advantage over that of the first embodiment in that because the spring 134 is located between the three pin openings 114-116 the arrangement is more compact.

The three embodiments have an advantage over prior known construction in that any wear of the earth pin on the shutter does not affect the unshuttering. Furthermore because unlatching on the flank of the earth pin and this does not have to move the shutter against the shutter spring, there is only a small amount of friction at the point of initial plug insertion. In order to move the shutter it is necessary to insert all three pins simultaneously. If say the earth pin or similar protrusion is not present the shutter remains latched by members 21 or 121. If either the live or neutral pin is missing then arms 27 or 127 remain latched. If a two pin plug of say the Continental European Standard is inserted and the latching members 21 or 121 are somehow forced to unlatch then the depressed areas 50 or 150 inhibit longitudinal shutter movement. The construction of the shutter and its latching members as a single item keeps the cost to a minimum. All that is required for the shutter arrangements is a spring and the shutter including latching means. Any remaining parts such as the stop 22 or 122 are moulded as part of the socket assembly. For this reason also, assembly of the socket during manufacture is simple and cost effective. Furthermore, the manufacturing tolerances in the constructions shown are not too critical as is the case in many early shuttering arrangements.

Claims

1. An electrical socket (1) having at least two socket contacts for connection with two or more pin contacts of a plug (3) and a shutter (20) for closing plug pin openings in a front wall (2) of the socket to cover two of the contacts in the absence of the plug wherein the shutter is latched in the closed position by means of at least a first latch (21, 22) operable by means of a plug earth pin or protrusion (4) from a plug other than the live and neutral pins (5,6) of said plug characterised in that the first latch (21, 22) formed as at least one latching member (21) extending from the shutter which is pushed to one side by the earth pin or protrusion (4) in a lateral direction as between the live and neutral pins (5,6) so as to release the member from a stop.

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part of the plug moulding and end wall 152 of the shutter. The shutter with members 121 unlatched from stop 122 moves to the position shown in Fig. 11 where the members return by means of their resilience to their central position with the chamfered end portions 119 lying in recesses 135 in stop 122.

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The three embodiments have an advantage over prior known construction in that any wear of the earth pin on the shutter does not affect the unshuttering. Furthermore because unlatching on the flank of the earth pin and this does not have to move the shutter against the shutter spring, there is only a small amount of friction at the point of initial plug insertion. In order to move the shutter it is necessary to insert all three pins simultaneously. If say the earth pin or similar protrusion is not present the shutter remains latched by members 21 or 121. If either the live or neutral pin is missing then arms 27 or 127 remain latched. If a two pin plug of say the Continental European Standard is inserted and the latching members 21 or 121 are somehow forced to unlatch then the depressed areas 50 or 150 inhibit longitudinal shutter movement. The construction of the shutter and its latching members as a single item keeps the cost to a minimum. All that is required for the shutter arrangements is a spring and the shutter including latching means. Any remaining parts such as the stop 22 or 122 are moulded as part of the socket assembly. For this reason also, assembly of the socket during manufacture is simple and cost effective. Furthermore, the manufacturing tolerances in the constructions shown are not too critical as is the case in many early shuttering arrangements.

Claims

1. An electrical socket (1) having at least two socket contacts for connection with two or more pin contacts of a plug (3) and a shutter (20) for closing plug pin openings in a front wall (2) of the socket to cover two of the contacts in the absence of the plug wherein the shutter is latched in the closed position by means of at least a first latch (21, 22) operable by means of a plug earth pin or protrusion (4) from a plug other than the live and neutral pins (5,6) of said plug characterised in that the first latch (21, 22) formed as at least one latching member (21) extending from the shutter which is pushed to one side by the earth pin or protrusion (4) in a lateral direction as between the live and neutral pins (5,6) so as to release the member from a stop.





2. A socket as claimed in claim 1 wherein initial insertion of the earth pin (4) so as to release the latching member (21) or members from the stop results in no movement of the shutter (20) in a direction parallel to the centre line of the plug (3) perpendicular to the line between the centre of the openings in the front wall of the socket for the live and neutral pin contacts (5,6).
3. A socket as claimed in claim 1 or 2 wherein the shutter (20) is formed with at least one lateral ramped portion (25) to close the live and neutral openings (15, 16) in the front wall and wherein the latching member (21) or members extend from the lateral portion or portions, the shutters (20) being urged into position by a spring means (34).
4. A socket as claimed in any one of claims 1 to 3 wherein the lateral portion (25) or portions are formed on arms (27) latched by a second latch in the closed position the second latch (29,31) being operable by means of said plug's live and neutral pins (5,6).
5. A socket as claimed in claim 4 wherein the second latch (29,31) comprises edges (29) on the arms (27) and grooves (31) in the socket into which the edges (29) engage in the closed position.
6. A socket as claimed in claims 4 or 5 wherein the arms (27) extend laterally from a resilient central web portion (32).
7. A socket as claimed in any one of claims 4 to 6 wherein the arms (27) are mounted to the shutter (20) so as to be resiliently urged upwards towards the outer surface of the front wall.
8. A socket as claimed in any one of claims 1 to 7 wherein the stop (22) has a recess or recesses (35) to receive the latching member or members in a position where the openings in the front wall (2) of the socket are unshuttered and so as to enable the latching member or members to return in the lateral direction substantially to a situation assumed before the release from the stop (22).
9. A socket as claimed in any one of claims 4 to 8 wherein the arms (27) with their edges (29) are forced downwards by insertion of the live and neutral pins (5,6) to disengage from the grooves whereby the shutter (20) is enabled to move rearwardly away from an opening in said front wall of the socket for the earth pin or protrusion (4) and wherein the stop is between the openings (14) for the earth pin or protrusion (4) and those (15, 16) for the live and neutral pins (5,6).

10. A socket as claimed in any one of claims 4 to 8 wherein the arms (27) with their edges (29) are forced downwards by insertion of the live and neutral pins (5,6) to disengage from the grooves whereby the shutter is enabled to move forwardly toward an opening in said front wall (2) of the socket for the earth pin or protrusion (4), and wherein the stop (22) is located at a position adjacent the side of the opening (14) for the earth pin or protrusion (4) opposite that side nearest the openings (15, 16) for the live and neutral pins (5,6).
11. A socket as claimed in claim 3 wherein the spring means (34) is a coiled compression spring located between two said latching members and a part of the socket adjacent the opening (14) for the earth pin or protrusion (4).

20 Patentansprüche

1. Elektrische Steckdose (1) mit mindestens zwei Steckdosenkontakten für die Verbindung mit zwei oder mehreren Stiftkontakten eines Steckers (3) und einem Verschluss (20) für das Schließen von Steckerstiftöffnungen in einer Frontwand (2) der Steckdose zur Abdeckung von zwei der Kontakte bei gezogenem Stecker, worin der Verschluss in der Schließstellung verriegelt ist mittels mindestens einer ersten Verriegelung (21, 22), die durch einen Steckerschutzkontaktstift oder Vorsprung (4) aus einem Stecker außer durch die stromführenden und Nulleiterstifte (5, 6) des Steckers betätigbar ist, **dadurch gekennzeichnet**, daß die erste Verriegelung (21, 22) als mindestens ein sich von dem Verschluss erstreckendes Verriegelungsglied (21) ausgebildet ist, welches durch den Schutzkontaktstift oder Vorsprung (4) zu einer Seite in einer Querrichtung wie zwischen den stromführenden und Nulleiterstiften (5, 6) geschoben wird, um das Glied von einem Anschlag zu entriegeln.
2. Steckdose nach Anspruch 1, worin anfängliche Einführung des Schutzkontaktstiftes (4) zur Entriegelung des Verriegelungsgliedes (21) oder der -glieder von dem Anschlag zu keiner Bewegung des Verschlusses (20) in einer Richtung parallel zur Mittellinie des Steckers (3) senkrecht zu der Linie zwischen der Mitte der Öffnungen in der Frontwand der Steckdose für die stromführenden und Nulleiterstiftkontakte (5, 6) führt.
3. Steckdose nach Anspruch 1 oder 2, worin der Verschluss (20) mit mindestens einem seitlich abgechrägten Bereich (25) geformt ist, um die stromführenden und Nulleiteröffnungen (15, 16) in der Frontwand zu schließen, und worin das Verriegelungsglied (21) oder die -glieder sich von dem seitlichen



Bereich oder den Bereichen erstrecken, wobei der Verschuß (20) durch eine Feder (34) in Position gedrängt ist.

4. Steckdose nach einem der Ansprüche 1 bis 3, worin der seitliche Bereich (25) oder die Bereiche an Armen (27) ausgebildet sind, die durch eine zweite Verriegelung in der Schließstellung verriegelt sind, wobei die zweite Verriegelung (29, 31) durch die stromführenden und Nulleiterstifte (5, 6) des Steckers betätigbar ist. 5 10
5. Steckdose nach Anspruch 4, worin die zweite Verriegelung (29, 31) Kanten (29) an den Armen (27) und Nuten (31) in der Steckdose umfaßt, in welche die Kanten (29) in der Schließstellung eingreifen. 15
6. Steckdose nach Anspruch 4 oder 5, worin die Arme (27) sich seitlich von einem elastischen mittleren Stegbereich (32) erstrecken. 20
7. Steckdose nach einem der Ansprüche 4 bis 6, worin die Arme (27) so an dem Verschuß (20) angebracht sind, daß sie elastisch aufwärts zur Außenfläche der Frontwand hin beaufschlagt sind. 25
8. Steckdose nach einem der Ansprüche 1 bis 7, worin der Anschlag (22) eine Ausnehmung oder Ausnehmungen (35) aufweist zur Aufnahme des Verriegelungsgliedes oder der -glieder in einer Position, in welcher die Öffnungen in der Frontwand der Steckdose unverschlossen sind, und so um dem Verriegelungsglied oder den Gliedern zu ermöglichen zurückzukehren in der seitlichen Richtung im wesentlichen zu einer Situation, die vor der Entriegelung von dem Anschlag (22) eingenommen war. 30 35
9. Steckdose nach einem der Ansprüche 4 bis 8, worin die Arme (27) mit ihren Kanten (29) durch Einführen der stromführenden und Nulleiterstifte (5, 6) abwärts gedrückt werden, um den Eingriff mit den Nuten aufzuheben, wodurch dem Verschuß (20) ermöglicht wird, sich rückwärts von einer Öffnung in der Frontwand der Steckdose für den Schutzkontaktstift oder Vorsprung (4) wegzubewegen, und worin sich der Anschlag zwischen den Öffnungen (14) für den Schutzkontaktstift oder Vorsprung (4) und denen (15, 16) für die stromführenden und Nulleiterstifte (5, 6) befindet. 40 45
10. Steckdose nach einem der Ansprüche 4 bis 8, worin die Arme (27) mit ihren Kanten (29) durch Einführen der stromführenden und Nulleiterstifte (5, 6) abwärts gedrückt werden, um den Eingriff mit den Nuten aufzuheben, wodurch dem Verschuß ermöglicht wird, sich vorwärts zu einer Öffnung in der Frontwand (2) der Steckdose für den Schutzkontaktstift oder Vorsprung (4) hinzubewegen, und worin sich der 50 55

Anschlag (22) in einer Position benachbart der Seite der Öffnungen (14) für den Schutzkontaktstift oder Vorsprung (4) befindet, die derjenigen Seite entgegengesetzt ist, die den Öffnungen (15, 16) für die stromführenden und Nulleiterstifte (5, 6) nächstgelegen ist.

11. Steckdose nach Anspruch 3, worin die Feder (34) eine Schraubendruckfeder ist, die zwischen zwei der Verriegelungsglieder und einem der Öffnung (14) für den Schutzkontaktstift oder Vorsprung (4) benachbarten Teil der Steckdose angeordnet ist.

15 Revendications

1. Prise de courant électrique (1) possédant au moins deux contacts de prise pour une connexion avec deux ou plusieurs broches d'une fiche (3) et un obturateur (20) pour fermer les ouvertures de broche dans une paroi antérieure (2) de la prise pour recouvrir deux des contacts en l'absence de la fiche, l'obturateur étant verrouillé en position fermée au moyen d'au moins un premier verrou (21, 22) actionnable au moyen d'une broche de terre de la fiche ou d'une partie (4) saillant d'une fiche autre que les broches actives et de neutre (5, 6) de ladite fiche, caractérisée en ce que le premier verrou (21, 22) est réalisé en tant qu'au moins un élément de verrouillage (21) s'étendant depuis l'obturateur qui est poussé vers un côté par la broche de terre ou la partie saillante (4) dans une direction latérale telle qu'entre les broches actives et de neutre (5, 6) de manière à libérer l'élément d'une butée.
2. Prise de courant selon la revendication 1, dans laquelle l'introduction initiale de la broche de terre (4) de manière à libérer le ou les éléments de verrouillage (21) de la butée se traduit par aucun mouvement de l'obturateur (20) dans une direction parallèle à l'axe de la fiche (3) perpendiculaire à l'axe entre le centre des ouvertures dans la paroi frontale de la prise pour les contacts de broches actives et de neutre (5, 6).
3. Prise de courant selon la revendication 1 ou 2, dans laquelle l'obturateur (20) est réalisé avec au moins une partie inclinée latérale (25) pour fermer les ouvertures actives et de neutre (15, 16) dans la paroi antérieure et dans laquelle le ou les éléments de verrouillage (21) s'étendent depuis la ou les parties latérales, l'obturateur (20) étant poussé en position par un moyen formant ressort (34).
4. Prise de courant selon l'une quelconque des revendications 1 à 3, dans laquelle la ou les parties latérales (25) sont réalisées sur des bras (27) verrouillés par un second verrou en position fermée, le second



verrou (29, 31) étant actionnable au moyen desdites broches actives et de neutre de la fiche.

deux éléments de verrouillage et une partie de la prise adjacente à l'ouverture (14) pour la broche de terre ou la partie saillante (4).

5. Prise de courant selon la revendication 4, dans laquelle le second verrou (29, 31) comporte des bords (29) sur les bras (27) et les gorges (31) dans la prise dans lesquelles pénètrent les bords (29) en position fermée. 5
6. Prise de courant selon les revendications 4 ou 5, dans laquelle les bras (27) s'étendent latéralement depuis une âme centrale élastique (32). 10
7. Prise de courant selon l'une quelconque des revendications 4 à 6, dans laquelle les bras (27) sont montés sur l'obturateur (20) de manière à être poussés élastiquement verticalement en direction de la surface extérieure de la paroi frontale. 15
8. Prise de courant selon l'une quelconque des revendications 1 à 7, dans laquelle la butée (22) possède un ou plusieurs évidements (35) pour recevoir le ou les éléments de verrouillage dans une position dans laquelle les ouvertures de la paroi frontale (2) de la prise ne sont pas obturées et de manière à permettre à l'un ou aux éléments de verrouillage de revenir dans la direction latérale sensiblement dans une situation prise avant le dégagement de la butée (22). 20 25
9. Prise de courant selon l'une quelconque des revendications 4 à 8, dans laquelle les bras (27) avec leurs bords (29) sont poussés vers le bas par introduction des broches actives et de neutre (5, 6) pour se dégager des gorges de telle sorte que l'obturateur (20) puisse s'écarter vers l'arrière d'une ouverture dans ladite paroi frontale de la prise pour la broche de terre ou la partie saillante (4) et dans laquelle la butée se trouve entre les ouvertures (24) pour la broche de terre ou la partie saillante (4) et celles (15, 16) pour les broches actives et de neutre (5, 6). 30 35 40
10. Prise de courant selon l'une quelconque des revendications 4 à 8, dans laquelle les bras (27) avec leurs bords (29) sont poussés vers le bas par introduction des broches actives et de neutre (5, 6) pour se dégager des gorges de telle sorte que l'obturateur puisse se déplacer vers l'avant en direction d'une ouverture dans ladite paroi frontale (2) de la prise pour la broche de terre ou la partie saillante (4) et dans laquelle la butée (22) est située en une position adjacente au côté de l'ouverture (24) pour la broche de terre ou la partie saillante (4) en vis-à-vis du côté le plus proche des ouvertures (15, 16) pour les broches actives et de neutre (5, 6). 45 50 55
11. Prise de courant selon la revendication 3, dans laquelle les moyens formant ressort (34) sont un ressort de compression hélicoïdal disposé entre lesdits