March 20, 1951 P. DE BEAUVAIS 2,546,061

SOCKET CONTACT WITH RESILIENT INSERTS

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Fig:1

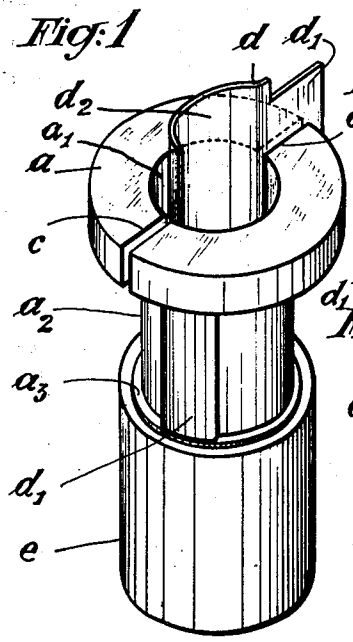


Fig:2

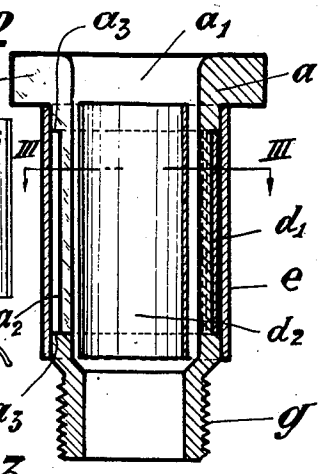


Fig:4

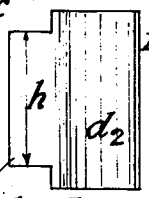


Fig:5

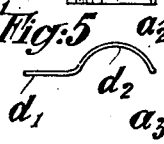


Fig:3

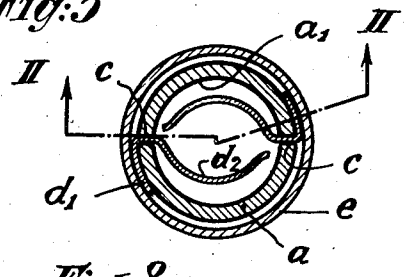


Fig:6

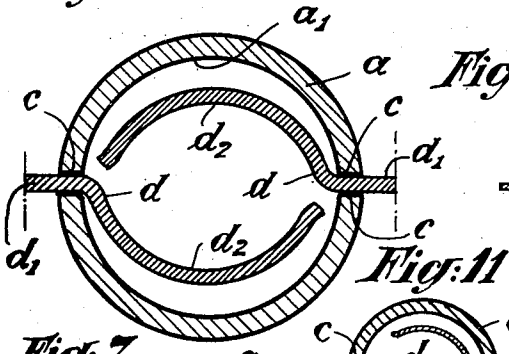


Fig:8

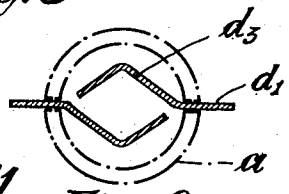


Fig:11

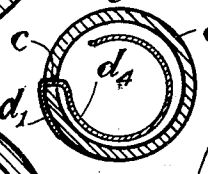


Fig:9

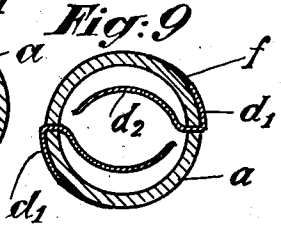


Fig:7

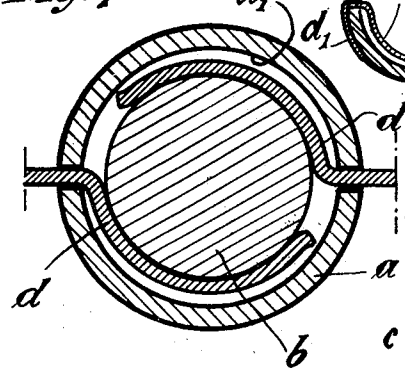
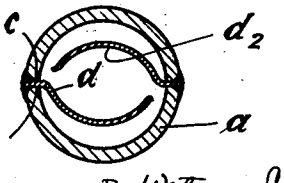


Fig:10



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SOCKET CONTACT WITH RESILIENT INSERTS

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Fig. 16

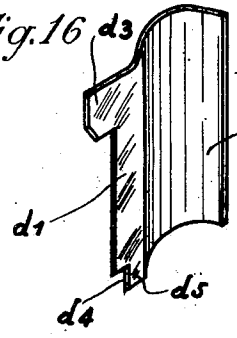


Fig. 14

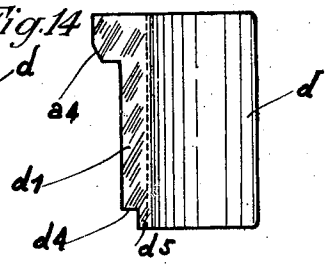


Fig. 13

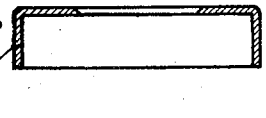


Fig. 15

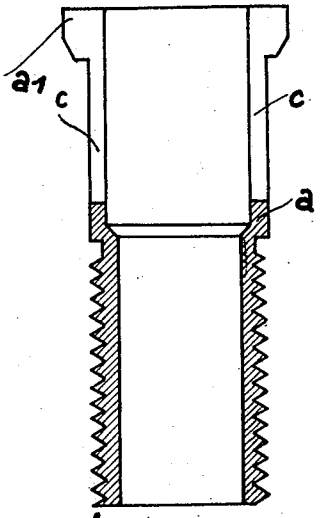


Fig. 17.

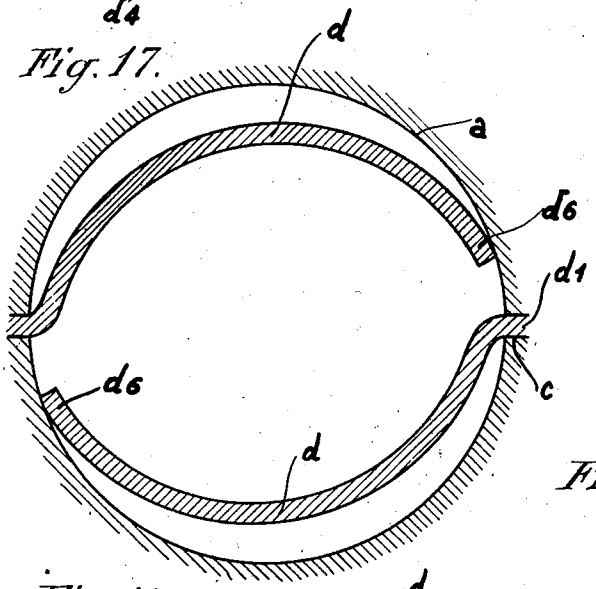


Fig. 12

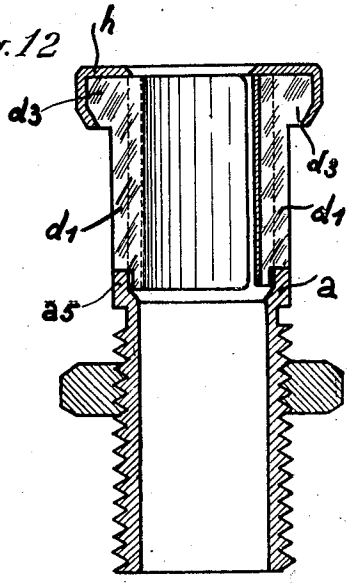
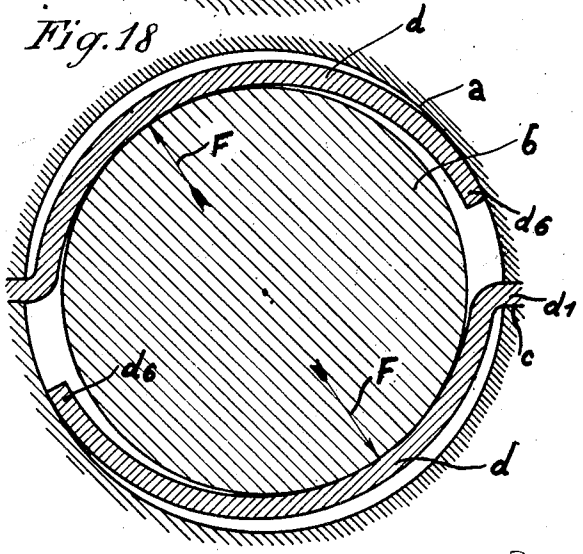


Fig. 18



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UNITED STATES PATENT OFFICE

2,546,061

SOCKET CONTACT WITH RESILIENT INSERTS

Pierre de Beauvais, Paris, France

Application August 24, 1948, Serial No. 45,902
In France January 19, 1948

9 Claims. (Cl. 173—363)

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The present invention has for its object a socket for an electric contact plug, such as a socket for an electric switch, constructed so as to improve the electric contact established intermittently by means of a plug.

This socket, of which the bore has a diameter greater than that of the plug, has in its bore one or more leaves or elements of semi-circular V or other cross section secured at one end of the socket in such a way as to permit the introduction of the plug by elastic deformation of the said leaf or leaves.

According to one form of construction, the socket has two diametrically opposed slots extending for a part of its length, whilst the leaves which are two in number comprise a plane part or tail adapted to be engaged in a slot in the socket and a part which has a semi-cylindrical V or other cross section which is housed in the bore, the end of the tail which projects externally, being held against the outer surface of the socket or welded or otherwise secured in any suitable manner to the socket.

A further feature of the invention consists in a particular arrangement of the leaves such that the elastic deformation of the latter, during introduction of the contact plug into the socket, takes place almost over the whole width of the said leaves.

A further feature of the invention consists in that the leaves comprise at the upper end a projecting portion which engages in the head of the socket, and which is held in place by means of a cap which covers the head of the socket and the projecting portion of the leaves.

The following description, read in connection with the annexed drawings, which is given merely by way of example, will enable the manner in which the invention can be carried out, to be understood, the features shown in the drawing and described in the text forming of course part of the invention.

Fig. 1 is a perspective view on a larger scale of the socket, showing how one of the leaves is positioned, another leaf being already secured to the socket.

Fig. 2 is a longitudinal section of a socket with elastic leaves taken on the line II—II of Fig. 3.

Fig. 3 is a horizontal section on the line III—III of Fig. 2.

Figs. 4 and 5 are respectively, a detailed view in elevation and an end view of a leaf, on a smaller scale than that of Fig. 1.

Figs. 6 and 7 are views on a larger scale showing in section how gripping of the plug is effected.

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Figs. 8, 9, 10 and 11 show modifications.

Fig. 12 is a section on a larger scale of a further form of construction of the socket.

Figs. 13, 14 and 15 are detail views of Fig. 12.

Fig. 16 is a perspective view of a leaf.

Figs. 17 and 18 are sectional diagrammatic views of a larger scale of the socket, showing the arrangement of the leaves before and after insertion of the contact plug in the socket.

In the form of construction shown in Figs. 1 to 7 the socket comprises:

On the one hand a flanged tubular member a of which the bore a^1 has a diameter greater than that of the plug b, and which has a slot c in a diametrical plane on part of its length.

On the other hand a pair of elastic leaves d which have a plane or tail portion d^1 which is introduced in the slot c and a curved part d^2 of semi-cylindrical form which is inserted into the bore a^1 of the socket with a certain amount of play when the plug is in position.

The tail d^1 is of sufficient radial extent to enable it to project beyond the exterior of the tubular member a in such manner that it can be bent over externally as shown in Fig. 3, whereby the tail d^1 of the leaf engages the outer contour of the member a. In addition the tails d^1 are of a height h, Fig. 4, slightly less than that of part d^2 of the tubular member, as shown in Fig. 2, in which position the tails are held in place by circular flanges or bosses a^3 to prevent any axial displacement.

A calibrated sleeve or tube e may be provided to enclose the device, this ensuring intimate contact between the leaves and the tubular member of the socket as well as correct positioning of the leaves.

By referring to Fig. 6 it will be seen that when the plug is not inserted in the socket, the semi-cylindrical parts d^2 of the leaves project into the bore a^1 of the socket, and that when the plug b is inserted they are spread apart by elastic deformation. Fig. 7, with slight clearance between them and the inner surface of the bore, thus exerting on the plug a strong elastic pressure which ensures positioning of the plug, and enables perfect electrical contact to be maintained.

Instead of being semi-cylindrical, the leaves may be of V section as shown at d^3 in Fig. 8, or of any other section.

It is obvious that the method of securing the end or tail d^1 of each leaf to the tubular member a and the socket can be modified. For example the tail d^1 could be bent and held against the

socket, and secured in position by welding as shown at *f*, Fig. 9.

According to the modification shown in Fig. 10 the tail is of small radial extent substantially equal to that of the thickness of the body of the tubular member *a* or very slightly less than this, and secured in the slot *c* by electrical welding or otherwise.

The socket *a* may or may not comprise a screw-threaded portion *g*, or an extension of other device adapted to be encased in a plastic material.

In addition the number of leaves may be more than two, or on the other hand the socket might comprise only a single leaf, as shown at d^4 in Fig. 11.

In a modified form of construction shown in Figs. 12 to 18, the socket comprises a member *a* having on part of its length two longitudinal and diametrical slots *c* in which the tails d^1 of the leaves *d* are inserted.

The head a^1 (Fig. 15) of the body of the socket *a* of cylindrical form comprises at its base a truncated conical portion a^4, and the tail d^1 of the leaves is shaped in such a manner as to suit the outer surface of the body of the socket, that is to say, it has at its upper end a projection d^3 of which the edge is truncated or inclined at its base.

A cap *h* which engages the head a^1 of the body of the socket, after the leaves have been placed in position, is crimped over the conical part a^4, which ensures that the leaves are positioned in the socket.

It is pointed out that the tail d^1 of the leaves has at its base a small indentation d^2 which allows the lower end d^5 to bear against the non-slotted collar a^5 of the body of the socket as shown in Fig. 12, thus preventing any lateral displacement of the leaves.

Finally the leaves *d* are of a width such that their free ends d^6 come into contact with the internal wall of the socket, as shown in Fig. 17. Under these conditions, when the contact plug *b* is inserted into the socket elastic deformation is produced over almost the whole width of the leaves as shown in Fig. 18, where the resultant of the forces producing the displacement of the leaves is indicated at F.

This arrangement has the advantage of reducing the stress in the leaf tail portion engaging the slots to a minimum, whereas in the arrangement shown in Figs. 1 to 11 the corresponding tail portion works as a hinge, thus avoiding risk of deterioration of the leaves.

The leaves will generally be made of a strongly hardened material which is inoxidisable as well as having a high coefficient of electric conductivity, for example of phosphorus bronze, and the tubular member *a* may be of brass.

What I claim is:

1. A socket for an electric contact plug which comprises a tubular member having a longitudinal slot and a resilient metal leaf including a tail portion clamped in said slot and a plug contacting portion which projects from said tail portion inwardly into the bore of the tubular member and is curved therein to stand, for at least a considerable part thereof from the inner end of said tail portion, in spaced apart relationship with but at a small distance from the inner wall of said tubular member.

2. The combination of claim 1, wherein said tail portion of the metal leaf projects outwardly from said slot and is bent to lie in contact with the outer wall of said tubular member.

3. The combination of claim 1, said tail portion being further welded to said tubular member in said slot.

4. A socket for an electric contact plug which comprises a tubular member having a longitudinal slot, and a resilient metal leaf including a tail portion clamped in said slot and a plug contacting portion which projects from said tail portion inwardly into the bore of said tubular member, has its inner end away from said tail portion arranged to contact the inner wall of said tubular member, and is curved in said bore with a greater curvature radius than said bore so that between said inner end and said tail portion, said plug contacting portion stands in spaced apart relationship with respect to, but at a small distance from, the inner wall of said tubular member.

5. A socket for an electric contact plug which comprises a tubular member including a body and a head of slightly greater outer diameter than said body, said tubular member having a longitudinal slot through said head and a portion of said body, a resilient metal leaf including a tail portion which is clamped in said slot and has a projection along its outer edge, adapted and arranged to be accommodated wholly in that portion of said slot which is provided in said end, said resilient metal leaf further comprising a plug contacting portion which projects inwardly into the bore of said tubular member and is curved therein, and means for capping said head, comprising a depending flange around the outer periphery of said head.

6. The combination of claim 5, wherein the periphery of said head comprises a cylindrical surface and a frusto-conical surface, between said cylindrical surface and said body, having its apex on the same side as said body with respect to said head, said capping means having its flange crimped over said conical surface.

7. A socket for an electric contact plug which comprises a tubular member having a longitudinal slot, a resilient metal leaf including a tail portion clamped in said slot, the outer end of said tail portion which projects through said slot being bent back to lie in contact with the outer wall of said tubular member, and a plug contacting portion which projects from said tail portion inwardly into said bore and is curved therein, and a sleeve around said tubular member for retaining said bent outer end of said tail portion on said tubular member.

8. A socket for an electric contact plug which comprises a tubular member having a longitudinal slot from an end thereof and a peripheral groove intermediate its ends, a resilient metal leaf including a tail portion which is clamped in said slot and has an axial extent not greater than the axial extent of the portion of said slot situated in the peripherally grooved portion of said tubular member, said tail portion having its outer end projecting through said slot bent back to lie in contact with the outer surface of said peripherally grooved portion of said tubular member, said metal leaf further comprising a plug contacting portion which projects from said tail portion inwardly into said bore and is curved therein, and a sleeve of greater axial extent than said peripherally grooved portion of said tubular member, fitted around said tubular member for retaining said bent outer end of said tail portion on the outer surface of the peripherally grooved portion of said tubular member.

9. The combination of claim 8, which further comprises a head for said tubular member at the

named end thereof, providing an axial abutment for said sleeve.

PIERRE DE BEAUVAIS.

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