Feb. 28, 1939. A. H. SURPRENANT 2,149,196

ELECTRICAL CONNECTOR

Filed April 4, 1938

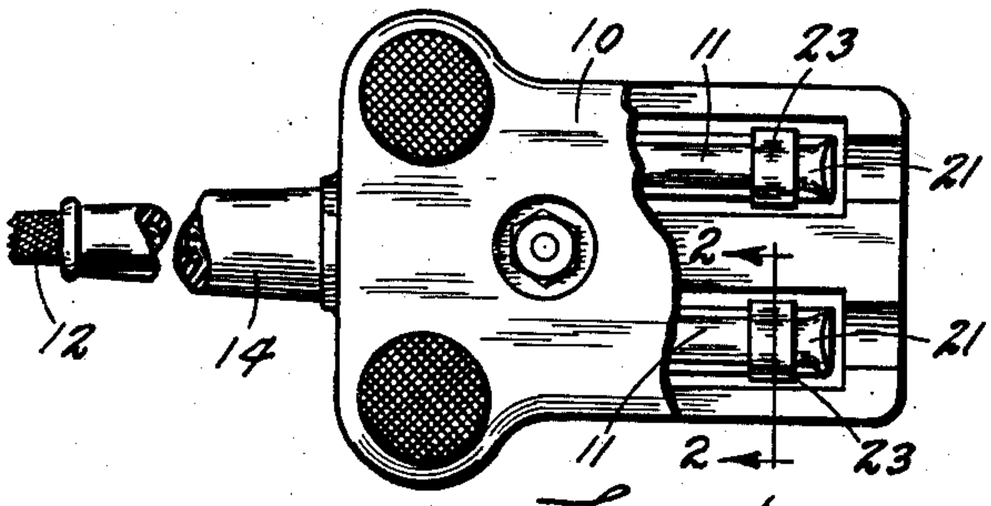

Fig. 1

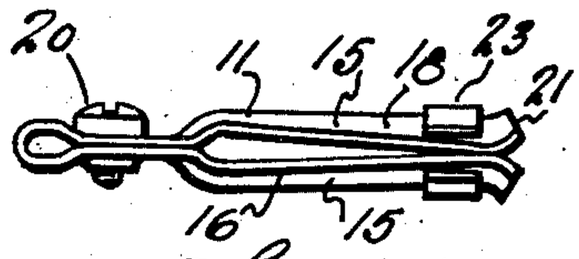

Fig. 4

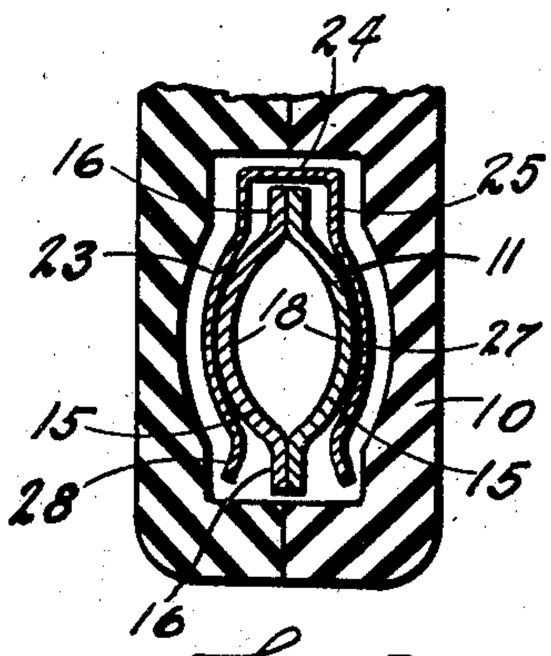

Fig. 2

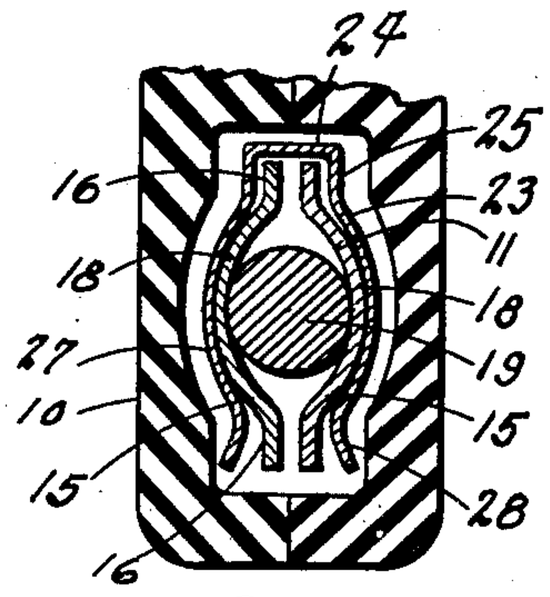

Fig. 3

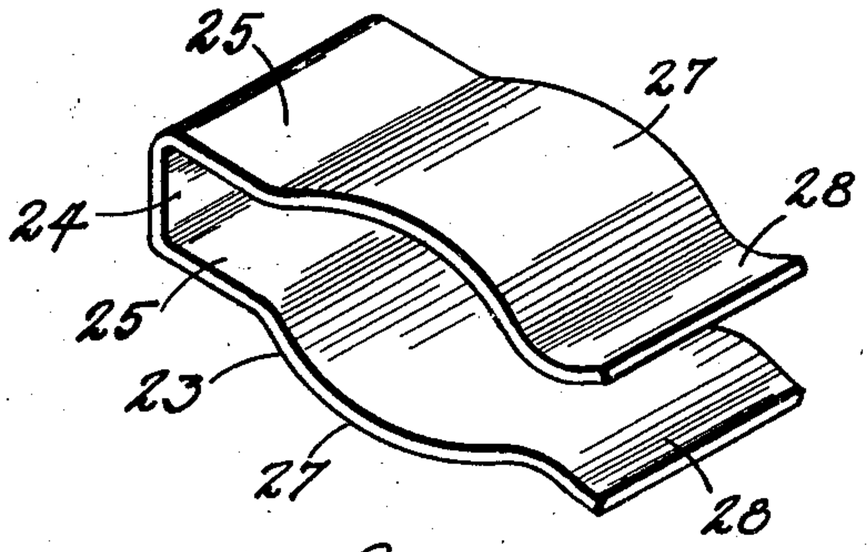

Fig. 5

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Patented Feb. 28, 1939 2,149,196

UNITED STATES PATENT OFFICE

2,149,196

ELECTRICAL CONNECTOR

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Application April 4, 1938, Serial No. 199,765

3 Claims. (Cl. 173—332)

This invention relates to electrical connectors, and more particularly to connectors of the type having a socket adapted to receive a metal terminal prong and to be expanded by the insertion of such prong. Connectors of this type are commonly provided with two of these sockets, and they are used in conjunction with electric irons, toasters and similar appliances.

Since the sockets are usually formed of a metal which is selected primarily because of its good electrical conductivity, they ordinarily lack the resilience necessary to maintain a firm contact with the prong. The initially poor contact causes arcing of the electric current and resulting in heating and rapid deterioration of the metal parts. This has been recognized, and it has proposed heretofore to utilize various types of steel springs to urge the socket parts into contact with the prongs, but in general these prior constructions have not proven satisfactory. In some cases the sockets have been complicated and expensive, and the springs could only be applied in the course of manufacture. In other cases the springs fail to remain in operative position. With still other proposed constructions the socket parts become twisted or distorted when the prong is inserted, preventing firm contact over a substantial area.

It is accordingly one object of the invention to provide a comparatively simple and inexpensive socket which will expand readily to receive a prong inserted therein and which will ensure a firm low-resistance electrical contact with the prong.

It is a further object of the invention to provide a comparatively simple and inexpensive socket of the type having a pair of opposed conductors between which a prong may be inserted, and a spring engaging the conductors to urge them against the prong.

It is a further object of the invention to provide a simple and inexpensive spring adapted to fit a socket of the expansible type and to force the socket parts into firm contact with an inserted prong.

With these and other objects in view, as will be apparent to those skilled in the art, the invention resides in the combination of parts set forth in the specification and covered by the claims appended hereto.

Referring to the drawing illustrating one embodiment of the invention and in which like reference numerals indicate like parts,

Fig. 1 is a view of an electrical connector, partially broken away to show the interior construction;

Fig. 2 is a greatly enlarged section taken on the line 2—2 of Fig. 1;

Fig. 3 is a view similar to Fig. 2, showing the socket expanded by the insertion of a cylindrical prong;

Fig. 4 is a side elevation of a socket; and

Fig. 5 is a greatly enlarged perspective view of a spring.

The embodiment illustrated comprises a body 10 of insulating material formed in two separable parts which are held together by any suitable means. This body 10 is recessed to receive a pair of spaced parallel sockets 11—11 to which electric current may be supplied through a two-conductor cord 12. This cord may be supported by the usual flexible sleeve 14 mounted at one end in the body 10.

Each socket 11 comprises a pair of adjacent members 15—15 formed of a suitable sheet metal having good electrical conductivity, these members having flanges 16 along their lateral edges and central transversely curved portions 18 formed with concave inner surfaces and convex outer surfaces, as shown particularly in Fig. 3, so that a cylindrical prong 19 may be inserted axially between the members to force them apart. It will be understood that a pair of these prongs 19 will be mounted in parallel positions upon the electric iron or other appliance to which electricity is to be supplied. As shown in Fig. 4, the two members 15—15 for each socket may be formed from a single piece of metal doubled back upon itself, with a screw 20 mounted therein near the folded end to facilitate connection of the electrical leads thereto in a well-known manner. The free ends of the members 15 are flared, as indicated at 21, to aid in the insertion of the prong.

In order to maintain adequate pressure between each socket and the inserted prong, and thus ensure a low-resistance electrical contact, I mount on each socket near the flared end 21 thereof a U-shaped spring 23 formed of a suitable thin sheet metal, such as spring steel, having high strength and resilience. As shown particularly in Fig. 5, each spring 23 comprises a base portion 24 and two cantilever portions 25 extending from the ends of the base portion at substantially right angles thereto. A curved portion 27 extends from each cantilever portion, the two curved portions having concave inner surfaces located directly opposite each other. The two cantilever portions 25 and the base por-

tion 24 form a loop which connects the two curved portions 27, the cantilever portions constituting the legs of the loop. The free ends of the two branches of the spring are flared outwardly at 28, adjacent the curved portions 27.

In assembling the parts the spring 23 is forced over the socket 11 from one side, the flared portions 28 facilitating this operation. The inner concave surfaces of the spring portions 27 engage the outer convex surfaces of the socket portions 18 and apply pressure to the members 15 from diametrically opposite points to force these members together, as indicated in Fig. 2. The cantilever portions 25 of the spring are spaced from the flanges 16 on the members 15 so that these members may separate upon insertion of the prong 19, as shown in Fig. 3, without any lateral tilting or twisting of the members. At the same time, the spring is held in place on the socket laterally and is prevented from turning thereon to any appreciable extent by the flanges 16.

The operation of the invention will now be apparent from the above disclosure. To effect an electrical connection, the body 10 will be grasped in one hand and the sockets 11 will be forced over the prongs 19 of the particular appliance which is to be energized electrically. These prongs will force the members 15 apart, as shown in Fig. 3, the springs 23 holding these members in firm contact with the prongs. The separation of the socket members 15 takes place evenly on both sides, without any tendency to tilt or twist these parts laterally. The construction of the sockets, as well as that of the springs, is comparatively simple and inexpensive. The springs can be readily placed over the sockets from either side, and will remain in proper position thereon without any tendency toward lateral slipping.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An electrical connector comprising a pair of adjacent members having their inner surfaces concave and their outer surfaces convex, said members forming a socket adapted to receive a cylindrical prong which may be inserted axially between said members to force them apart, and a U-shaped spring having two opposed inwardly concave curved portions and a loop portion connecting said curved portions, the said curved portions engaging the outer convex surfaces of the two members respectively at diametrically opposite points to urge said members together and to hold the spring in position thereon, the legs of the loop portion of the spring being spaced from the outer surfaces of said members sufficiently to allow expansion of the socket upon insertion of the prong without lateral tilting or twisting of said members.

2. An electrical connector comprising a pair of adjacent members having their inner surfaces concave and their outer surfaces convex, said members forming a socket adapted to receive a cylindrical prong which may be inserted axially between said members to force them apart, and a U-shaped spring having a base portion, two cantilever portions extending from the base portion, and an inwardly concave curved portion extending from each cantilever portion, the said inwardly concave curved portions engaging the outer convex surfaces of the two members respectively at diametrically opposite points to urge said members together and to hold the spring in position thereon, the cantilever portions adjacent to the base portion being spaced from the outer surfaces of said members sufficiently to allow expansion of the socket upon insertion of the prong without lateral tilting or twisting of said members.

3. A spring for an electrical connector comprising an imperforate base portion, two cantilever portions extending from the ends of the base portion at substantially right angles thereto, and a curved portion extending from each cantilever portion, the two curved portions having concave inner surfaces located directly opposite each other, the spring being formed of spring steel of uniform thickness throughout.

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