

April 16, 1946.

C. A. WOODWARD
ELECTRICAL CONTACT PLUG
Filed Dec. 10, 1942

2,398,684

Fig. 1.

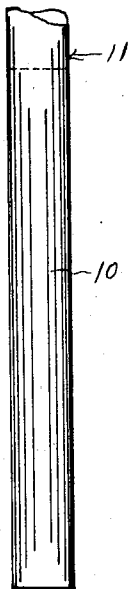


Fig. 2.

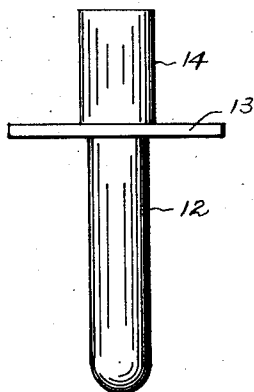


Fig. 3.

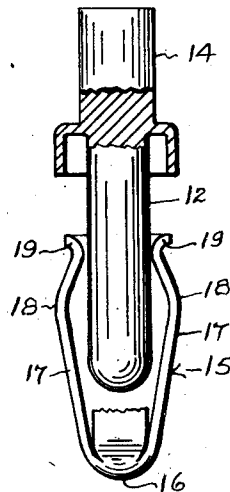


Fig. 5.

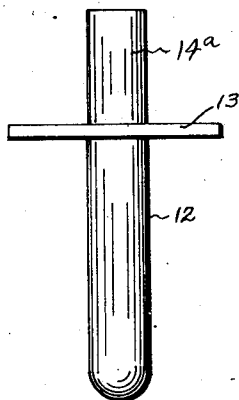


Fig. 6.

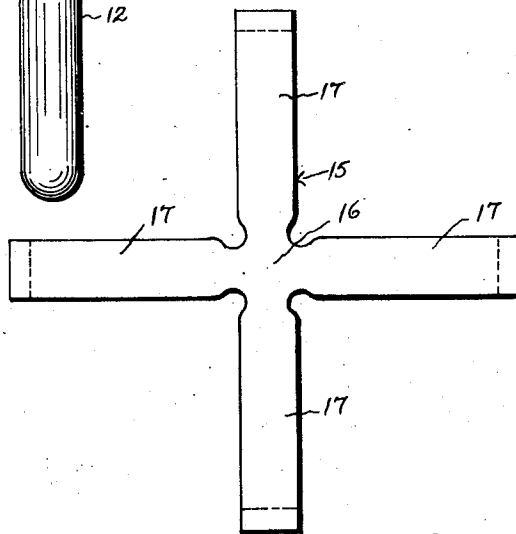
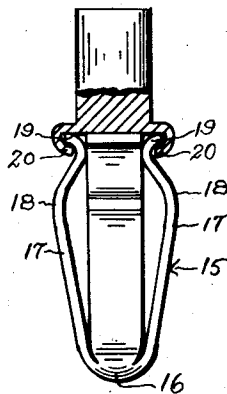


Fig. 4.



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UNITED STATES PATENT OFFICE

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ELECTRICAL CONTACT PLUG

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1 Claim. (Cl. 173—363)

The present invention relates to improvements in electrical contact plugs, particularly to those of the so-called banana pin type, and aims generally to improve the construction of such plugs as well as the method of making them.

Electrical contact plugs of the banana pin type, as are commonly used in various electrical apparatus, for example in electrical discharge or thermionic tubes, comprise a central stem and a split sheet metal cage attached thereto, which cage has portions bulged outwardly from the stem so as to make resilient contact with the sockets in to which they are inserted. The central stem preferably has a solid core within the cage, and an integral skirt or flange clinched under a portion of the cage, and an outwardly disposed head which is embedded in the molded base of the tube or other article and to which an electrical conductor is connected.

Heretofore, the central stem has been a screw-machine made part, and is thus a comparatively slowly and expensive made part. Such parts conventionally comprises a head, a cupped or skirted flange at one end thereof and a solid core disposed below the flange. The cage is placed around the core and the lower skirt of the flange is bent inwardly around portions of the cage to hold the cage and core in assembled relation.

My present invention relates to improvements in the construction and method of making the stem, permitting it to be made from a wire blank very rapidly and economically on a cold-heading machine.

In order better to illustrate the invention, reference is made to the following drawing in which:

Fig. 1 is a view of the end of a piece of wire from which a core is made;

Fig. 2 is a side elevation of the core after it is formed from the wire shown in Fig. 1;

Fig. 3 is a view of the core and the cage prior to assembly with the disk portion of the core shown in section after being cupped;

Fig. 4 is a side elevation of the complete device after assembly with a portion thereof shown in section to illustrate the manner of assembly;

Fig. 5 is a view illustrating a slightly modified form of the core; and

Fig. 6 is a plan view of the metal blank used in making the cage.

According to the invention, the stem of the plug may be efficiently, quickly and economically formed by first cutting a blank 10 of predetermined length from a piece of wire stock 11 of a selected uniform diameter or gauge, as shown in

Fig. 1. The blank thus formed is of substantially cylindrical wire stock.

The cylindrical blank thus formed is then subjected to a cold-heading operation for the purpose of providing, at one end, a cage core 12 and simultaneously form between its ends a substantially flat disc 13 or rim disposed in a plane normal to the axis of the blank. This may be done in a conventional cold-heading machine and preferably the disc 13 so formed is very thin, preferably of wafer thickness, and is readily deformable. The width of the disc, that is, from the cylindrical stock to the peripheral edge of the disc, is greater than the length of the part of the cage to be held by the disc, so that sufficient metal is provided to overlie and be folded under the cage part. At the same time an enlarged head portion 14 is provided above the disc which may be embedded in the molded support base for mounting the plug and effecting an electrical connection with a source of current supply.

The finger cage 15 is preferably formed from a cross-shaped blank of sheet metal having a solid center 16 and a plurality of radially extending fingers 17. The center portion 16 is preferably cupped so as to conform to the shape of the nose of the core 12 to provide a good electrical contact with substantially the entire semi-spherical end of the core 12. The fingers 17 extend away from the cupped portion in divergent direction and then in a convergent direction to provide outwardly spaced bulges or resilient bowed portions 18 spaced from said core 12. The terminal ends of the fingers 17 are flanged outwardly, as at 19, to bear against the underside of the disc 13 and to be secured in place by turning the peripheral edges of the disc 13 inwardly under the finger flanges, as at 20.

By constructing the stem and disc 13 in the manner above described, I am able to make it rapidly on a cold-heading machine, thus materially reducing the cost of manufacture as compared to making such a part on a screw-machine. The wafer-like disc 13 is readily deformable so that it may be clenched under the finger flange 19 in a single operation.

In the modified form of core shown in Fig. 5 the head portion 14^a remains the same diameter as the portion 12.

Advantages of the invention reside in the ease and economy in the manufacture of the plug stem which may be effected on rapidly operating cold-heading machines as distinguished from the slower screw-machine made parts. Furthermore, the invention makes possible the manufacture of

plug stems without waste of stock, as compared to the screw-machine made stems which were turned from stock of substantially greater diameter than the finished parts.

Although I have illustrated and described a preferred embodiment of my invention I do not wish to be limited thereby because the scope of my invention is best defined by the following claim.

I claim:

An electrical contact plug comprising a stem and a sheet metal yieldable cage, said cage hav-

ing a solid cupped central portion, spaced bowed resilient fingers extending therefrom which are formed with outwardly turned flanges at their free ends for attachment to said stem, said stem comprising a length of wire having an integral wafer-like disc intermediate its ends providing said stem with a head portion and a core for receiving said cage, the peripheral portion of said disc being bent around the outturned flanges of said cage fingers for securing said cage thereto in secure electrical contact therewith.

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