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F. H. SHAW

VACUUM TUBE BASE AND RECEPTACLE

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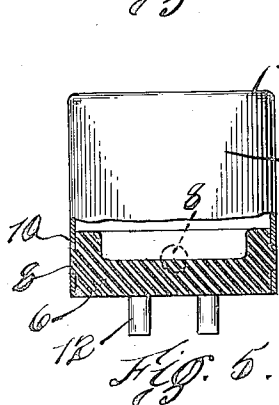
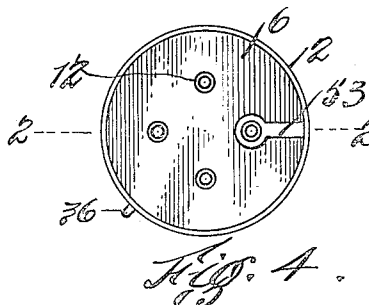
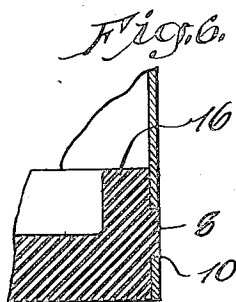
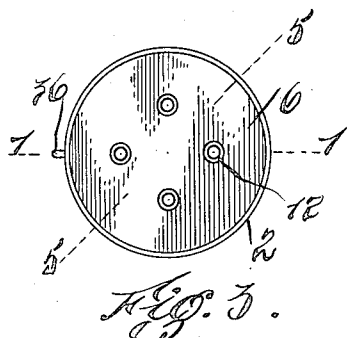
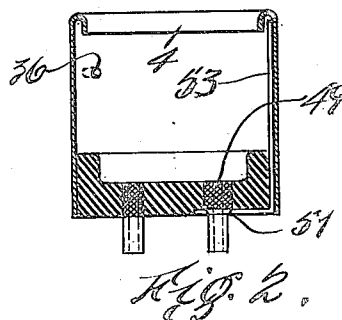
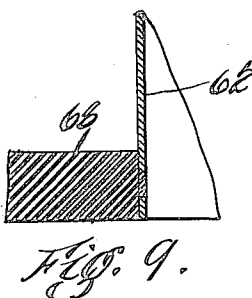
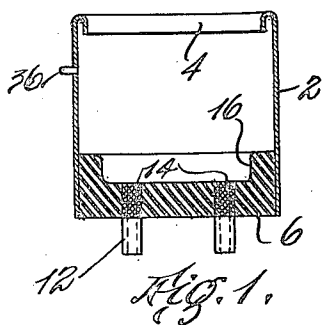
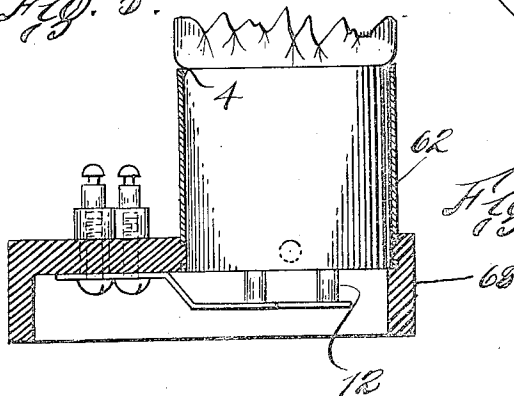
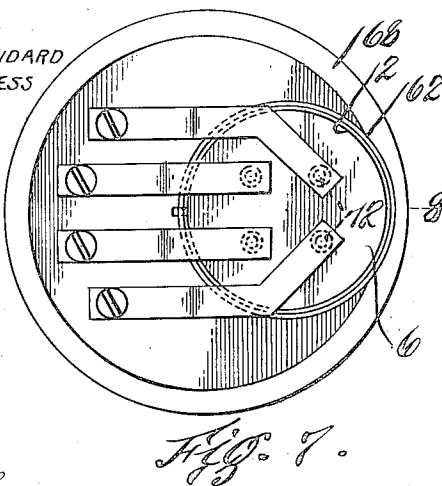
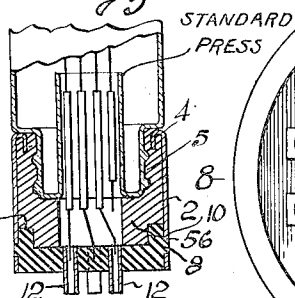


Fig. 10.



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UNITED STATES PATENT OFFICE.

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VACUUM TUBE BASE AND RECEPTACLE

Application filed August 20, 1919. Serial No. 318,636.

To all whom it may concern:

Be it known that I, FRANK H. SHAW, a citizen of the United States, residing at East Orange, New Jersey, have invented certain new and useful Improvements in Vacuum Tube Bases and Receptacles, of which the following is a clear, full, and exact description.

This invention relates to bases or receptacles for electrical apparatus, and a general object of the invention is to provide a base or receptacle which will better meet the varied conditions of use to which such structures are now frequently subjected, particularly when utilized in connection with radio telegraph apparatus, or with the electric or radio equipment of airplanes, with the consequent subjection to marked changes in temperature and in atmospheric conditions.

A particular object of the invention is the production of a base or receptacle having a closure of insulating material molded under pressure into air and moisture-proof fit in one end of the metallic shell of which the base is partly formed and also molded into interlocking relation to openings through said shell adjacent to the said end.

Other objects and important features of the invention will appear from the following description and claims when considered in connection with the accompanying drawings in which—

Fig. 1 is a sectional view on the line 1—1, Fig. 3, through a base for a vacuum detector tube provided with a four point contact;

Fig. 2 is a sectional view on the line 2—2, Fig. 4, through a base similar to that shown in Fig. 1, but having one of the contacts grounded for use with a tube requiring only a three point contact;

Fig. 3 is a bottom plan view of the base shown in Fig. 1;

Fig. 4 is a bottom plan view of the base shown in Fig. 2;

Fig. 5 is a section on the line 5—5 of Fig. 3, showing the novel interlock between the base shell and the insulating closure;

Fig. 6 is an enlarged detail section showing the novel interlock drawn to a larger scale;

Fig. 7 is a bottom plan view of a receptacle for use with the base of the tube shown in Fig. 1;

Fig. 8 is a section on the line 8—8 of 55 Fig. 7;

Fig. 9 is an enlarged detail of the interlock between the insulating part of the receptacle shown in Fig. 8 and the metallic shell;

Fig. 10 shows the manner in which a base of the type shown in Figures 1 or 2 is connected to the vacuum tube of a radio detector.

The base, which constitutes the subject-matter of the present invention, is particularly adapted for use with vacuum tubes such as are employed with incandescent lamps and is herein shown in Fig. 10 as employed with a detector tube constituting a part of a radio telegraph outfit of the type commonly employed with airplanes. These incandescent lamp detectors commonly have three or four terminals according to the type of detector employed and therefore two types of base are provided, that shown in Figs. 1 and 3 having four terminals, and that shown in Figs. 2 and 4 having one of the four terminals grounded so that there are only three effective terminals.

The base comprises essentially a metallic shell 2 having an inturned hook-like flange 4 adapted to constitute anchorage for the cement 5 by which the vacuum tube is locked to the base. One end of the shell is closed by a closure of insulating material, preferably material which will stand relatively great variations in temperature and atmospheric conditions, for example, bakelite, condensite, or other phenolic condensation product, and this closure is preferably molded into position under heavy pressure so that it will absolutely fill the open end of the shell and have an air and moisture proof fit in said shell end.

The illustrated closure 6, which is preferably of some phenolic condensation product, is locked in position in the shell by means of radial lugs or projections 8 formed in the molding operation by directing a component of the molding pressure laterally so that some of the insulating composition is forced out through the openings 10 in the shell 2. The mode of forming the closure 6 and the lugs 8 is fully described and illustrated in my co-pending application Serial No. 575,892 filed July 18, 1922, for Letters Patent for improvements in process of mak-

ing bases and receptacles for vacuum tubes. Also brought into air and moisture proof relation to closure 6 by the molding operation, and locked in position in said closure, are terminals 12 for the filament and for the conductors of the incandescent lamp detector. The terminals 12 are preferably provided with a burred surface 14 upon that part of each which is locked in the closure 6.

From an inspection of Figs. 1, 2, 5, 6 and 10, it will be noted that there is preferably formed on the closure 6 a shoulder 16, and that that part of the closure 6, in which the terminals 12 are locked, is preferably of such thickness that the inner ends of these terminals are substantially flush with the inner surface of that part of the closure 6. The shoulder 16 is not only an important structural feature of the base but the provision of this shoulder contributes to the successful molding of the insulation in air and moisture proof fit in the shell end and also to the forming of the lugs or radial projections 8 for the interlocking of the closure with the shell.

In order to form a three terminal socket, four terminals are preferably molded into position in the closure 6, but one of the terminals is grounded upon the shell of the socket. This grounding is effected in a novel manner, more fully shown in Figs. 2 and 4 of the drawings. From an inspection of these figures, it will be noted that the terminal to be grounded is provided with an enlarged head portion 49 which joins the exposed part of the terminal through a tapered shoulder 51. A contact strip 53 bent into rectangular shape has one leg extending along the inner wall of the shell 2 and the other leg provided with an opening of substantially the diameter of the outer part of the terminal 12 having the enlarged head 49 and shoulder 51, this opening being slipped over the exposed part of said terminal and into contact with the shoulder 51. During the molding operation, the action of the male and female molds forces the shoulder 51 and the opening in the angular piece 52 into close fitting relation to each other, the horizontal part of said angular piece being embedded in the closure 6 and thus brought into flush relation to the lower surface thereof. By spot welding or soldering the vertical part of the contact strip 53 to the inner face of the shell, an effective grounding of one of the terminals is obtained.

By forcing the insulating material, which, as above suggested, is preferably a phenolic condensation product, under pressure into close fitting relation to a smooth cylindrical shell surface and by interlocking the shell and the insulation by causing projections to be forced by the molding pressure

into spaced radially arranged openings in the shell, a base or receptacle construction has been provided which has been found to be most effective for meeting the extremes of temperature and atmospheric conditions to which such apparatus is now frequently subjected, particularly when utilized in connection with radio telegraph equipment for airplanes.

What I claim as new is:

1. A base for a vacuum tube or other electrical apparatus, comprising a shell having a cylindrical end and having molded into air and moisture proof fit in said cylindrical end, under pressure, a closure of insulating material, said shell having openings through the shell wall adjacent to said closure, and said closure and said shell being interlocked by individual radial projections from said closure molded under pressure into said openings.

2. A base for a vacuum tube or other electrical apparatus comprising a shell, an insulating closure formed of material having the general physical characteristics of a phenolic condensation product molded under pressure into sealing relation to one end of said shell, said shell having openings therethrough adjacent to said end, and said closure having integral individual radial projections molded into interlocking relation to said openings.

3. A base for a vacuum tube or other electrical apparatus, comprising a shell, a closure of insulating material molded, under pressure, into air and moisture proof fit in one end of said shell, said shell having openings therethrough adjacent to said closure, and said closure having integral individual radial projections molded under pressure into interlocking relation to said openings, and terminals carried by said closure and said closure being also molded under pressure into permanent air and moisture proof relation to said terminals.

4. A support for a vacuum tube or other electrical apparatus, comprising a shell, an insulating mounting for terminal posts formed of material having the general physical characteristics of a phenolic condensation product molded under pressure into close fitting engagement with said shell at one end thereof, said shell having individual radial openings therethrough and said insulating support having integral projections molded into interlocking relation to said openings, and terminal posts molded into permanently interlocked relation to and air and moisture proof connection with said closure.

5. A base for vacuum tubes or the like, comprising a metallic shell having molded into one end thereof, under pressure, insulating material, terminals molded in position in said insulating material, and means

for grounding one of said terminals comprising a metallic strip having an eye embracing said terminal, said strip being molded into embedded position in said insulation and said terminal having a conical shoulder, into tight fitting engagement with which said eye is pressed.

6. A base for a vacuum tube or other electrical apparatus, comprising a cylindrical shell having one end provided with an intumed margin reducing the opening at that end and having molded into air and moisture proof fit in the other end, under pressure, a closure of insulating material, said shell having openings in the shell wall adjacent to said closure, and said closure and said shell being interlocked by individual radial projections molded under pressure into said openings.

7. A base for a vacuum tube or other electrical apparatus, comprising a cylindrical shell having one end provided with an intumed margin reducing the opening at that end and having molded into air and moisture proof fit in the other end, under pressure, a closure of insulating material, said shell having openings in the shell wall adjacent to said closure, said closure and said shell being interlocked by individual radial projections molded under pressure into said

openings, and said closure being provided with a shoulder at least partly opposed to said radial projections.

8. A base for a vacuum tube or other electrical apparatus comprising a cylindrical shell intumed at one end to form a locking flange, an insulating closure molded under pressure into sealing relation to the other end of said shell, said shell having openings therein adjacent to said end, and said closure having integral individual radial projections molded into interlocking relation to said openings and being provided with a shoulder along its inner margin.

9. A base for a vacuum tube or other electrical apparatus comprising a shell having a cylindrical end and having an insulating closure molded under pressure into air and moisture proof fit in said cylindrical end, said shell having openings therethrough adjacent to said end, and said closure having integral individual radial projections molded under pressure into interlocking relation to said openings and also having a vertically and laterally compacted shoulder or flange at least partly opposed to said radial projections.

Signed at New York city, N. Y., this 5th day of August, 1919.

FRANK H. SHAW.