Nov. 3, 1959 A. I. APPLETON 2,910,962

APPARATUS FOR PRODUCING REFLECTORS

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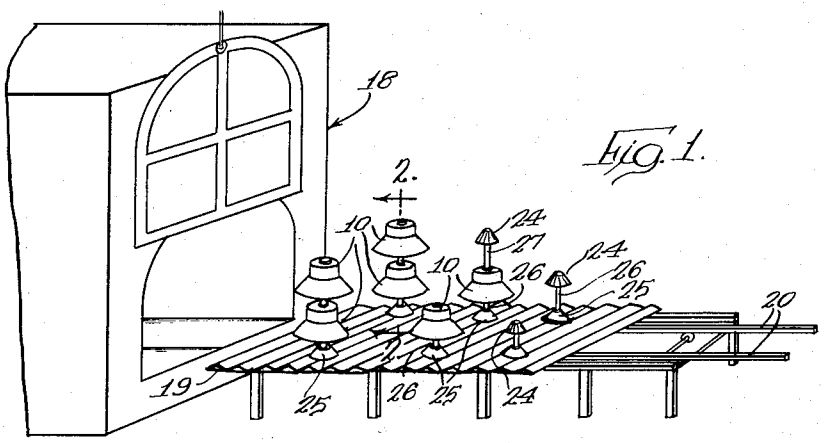


Fig. 1.

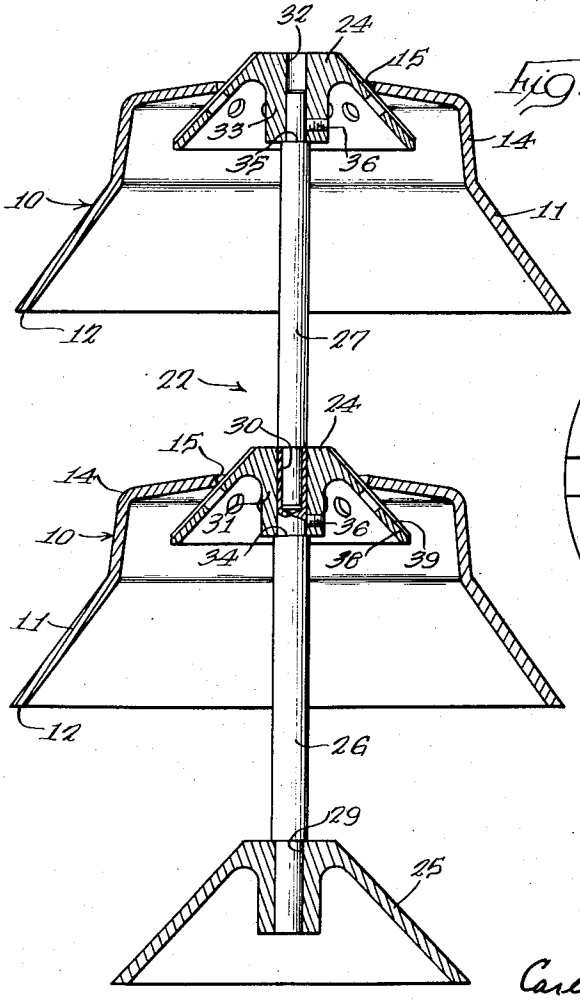


Fig. 2.

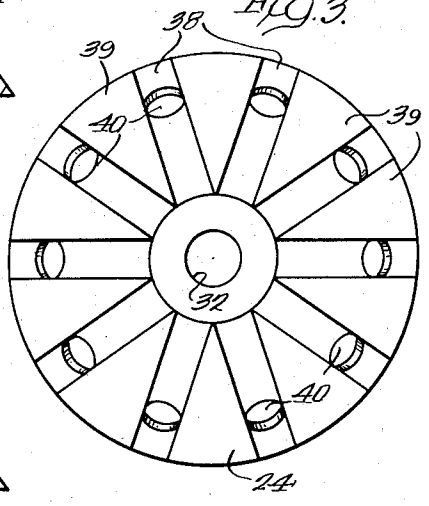


Fig. 3.

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Fig. 4.

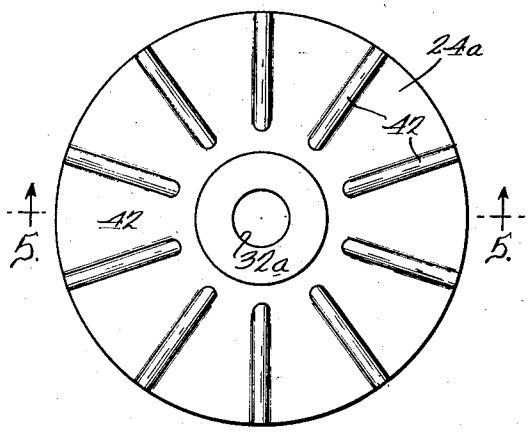


Fig. 5.

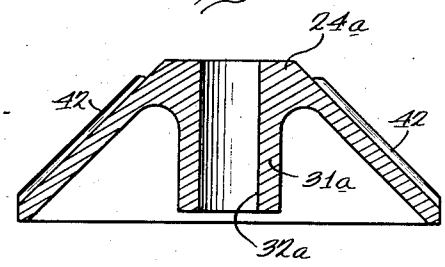


Fig. 6.

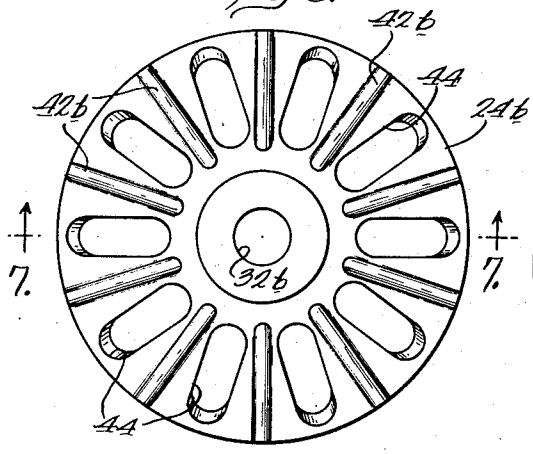
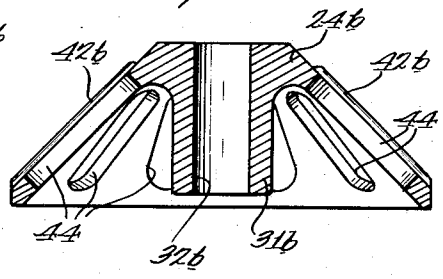


Fig. 7.



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Fig. 8.

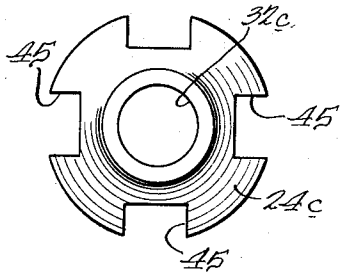


Fig. 9.

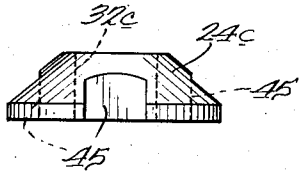


Fig. 10.

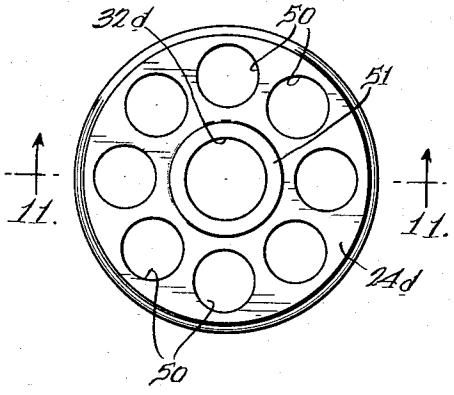
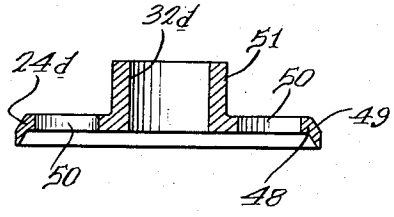


Fig. 11.



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APPARATUS FOR PRODUCING REFLECTORS

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Application April 9, 1958, Serial No. 727,422

8 Claims. (Cl. 118—500)

The present invention relates to the manufacture of porcelain enamel coated lighting reflectors and more particularly to a new and improved apparatus for use in firing enameled reflectors.

It is the general object of the present invention to provide an apparatus for producing procelain enamel coated lighting reflectors having enameled surfaces at a rate substantially greater than was heretofore possible by present commercial methods. Another object is to provide an apparatus for use in producing enameled reflectors which is easily used with presently existing furnace equipment yet which affords an increased rate of production therefrom and thereby economical manufacture of lighting reflectors.

It is another object of the present invention to provide an improved apparatus for use in producing porcelain enameled lighting reflectors having smooth, unblemished enamel surfaces. More specifically, it is an object of the present invention to provide an apparatus for supporting porcelain enamel glazed reflectors in a furnace without marring the porcelain finish thereon so that a reflector having a smooth, even, and unblemished surface is produced.

A further object of the present invention is to provide an improved apparatus of the foregoing character which increases the circulation of heated air around the reflectors and thereby decreases the firing time necessary. Still another object is to provide an apparatus of the foregoing character which is simple to assemble and use, is rugged, and is easily adapted for use with various sizes and shapes of reflectors.

Other objects and advantages of the present invention will become apparent as the following description proceeds taken in connection with the accompanying drawings wherein:

Figure 1 is a perspective view of a furnace being loaded with reflectors in accordance with the present invention.

Fig. 2 is a vertical section view of a reflector firing apparatus illustrative of the present invention supporting enameled reflectors.

Fig. 3 is a plan view of one of the reflector supporting cones shown in Fig. 2.

Fig. 4 is a plan view of a modified form of reflector supporting firing cone.

Fig. 5 is a vertical section view taken substantially in the plane of line 5—5 of Fig. 4.

Fig. 6 is a plan view showing still another modified form of reflector supporting firing cone.

Fig. 7 is a vertical section view taken substantially in the plane of line 7—7 of Fig. 6.

Fig. 8 is a plan view showing a modified form of reflector firing support for use with long-necked reflectors.

Fig. 9 is a vertical section view taken substantially in the plane of line 9—9 of Fig. 8.

Fig. 10 is a plan view of still a further modified form of reflector support.

Figure 11 is a vertical section view taken substantially in the plane of line II—II of Fig. 10.

While certain illustrative forms have been shown in the drawings and will be described below in considerable detail it should be understood that there is no intention to limit the invention to the specific forms disclosed. On the contrary, the intention is to cover all modifications, alternative constructions, equivalents, and uses falling within the spirit and scope of the invention as expressed in the appended claims.

Lighting reflectors having porcelain enamel coatings are of widely varying sizes and shapes depending upon their particular intended use and the desired distribution of light. One illustrative reflector **10** is shown in the drawings and comprises a concave annular rim portion **11** terminating in an outer edge **12** and tapering towards a tubular neck portion **14** defining a lamp fixture receiving opening **15**. The shape of the various portions will depend upon the lighting characteristics desired. The reflectors are generally made from a heavy gauge metal and are given one or more coats of porcelain vitreous enamel.

In the manufacture of reflectors of this type, the metal reflector body is generally formed from a heavy gauge metal and is given one or more coats of porcelain vitreous enamel. The enamel coating is generally white inside the reflector and green outside. The coating is then fired under appropriate conditions in a furnace to provide a porcelain enameled reflector.

An illustrative furnace for firing enamel coated reflectors is shown at **18** in Fig. 1. It is the present practice, in firing lighting reflectors which have been coated with a vitreous porcelain enamel, to support the reflectors directly on transverse rods **19** extending between longitudinal supports **20** in the furnace. In their present commercial form these rods **19** are generally triangular in shape so as to present a relatively narrow upper supporting edge to the lower edge of a reflector. It has been noted, however, that this method of supporting the reflector results in blemishes and scars on the lower edge **12** of the reflector caused by contact of the support rods with the unfired porcelain enamel coating. Supporting the reflectors directly on the rods further limits the capacity of the furnace to the floor area available in the furnace and on the supporting rods.

In accordance with the present invention, porcelain enamel coated reflectors **10** are supported in vertical pairs above the triangular rods as shown in Figs. 1 and 2 thereby preventing damage to the lower edges of the reflectors and at the same time increasing the capacity of the furnace. One apparatus embodying the present invention is illustrated in Figs. 1–3 and comprises a firing support **22** for elevating the reflectors **10** to be fired above the rods **12** and which tiers two or more of the reflectors in vertical alinement for firing in the furnace **11**. The lower edge **12** of the reflectors **10** never comes into contact with a support and remains smooth and unblemished. With one reflector tiered above another, the capacity of the furnace is at least doubled thereby increasing the rate of production and at the same time decreasing the cost per reflector fired.

For supporting the reflectors one above the other in tiered relation in the furnace, the novel firing support **22** comprises two or more support members **24** mounted on a base **25** by means of vertical post sections **26, 27**. The base **25** is desirably formed with a socket **29** which receives one inserted end of the lower post section **26** while the upper end of the post section **26** is formed with a socket **30** for receiving a reduced diameter inserted end of the upper post section **27**.

The support members **24** are positioned within the tubular neck portion **14** of the reflector and supportingly

engage the edge of the opening **15** therein. So that the reflector support **24** may readily accommodate various sizes of reflector openings, the support is generally frusto-conical in shape and defines a truncated cone having an annular outer surface on which the reflector is supported (Fig. 2). These cones are preferably hollow with a central sleeve portion **31** having a bore **32** for receiving an inserted reduced diameter end portion of the post on which the support is to be mounted. The intermediate cone, as shown in Fig. 2, is supported on the upper end of the first post, an annular shoulder **34** being provided on the latter against which the central sleeve portion of the cone support abuts. The upper post is then inserted in place in the lower post and a second cone is then placed upon the upper end of the second post. The diameter of the bore **32** in the upper cone may be somewhat smaller than the bore of the intermediate support cone and the upper post **27** is of a correspondingly reduced diameter. The upper cone receives an inserted reduced diameter end of the upper post and is in turn supported on a shoulder **35** thereon. The cones may fit freely on the posts or suitable set screws **36** may be provided.

To reduce the area of contact of the cones with the porcelain glaze on the reflectors and at the same time allow for free circulation of the air around the internal areas of the reflectors, the surfaces of the cone supports are desirably grooved or otherwise ridged to provide spaced land areas which engage the inner edge of the reflector opening. Hot air is thus able to circulate freely through the reflectors and escape through the grooves defined in the annular surface of the supporting cones. More specifically, the annular surface of each cone is formed with a plurality of elementally extending grooves **38** defining a plurality of land areas **39** on which a reflector will be supported (Fig. 3). The grooves **38** and corresponding land areas **39** may be of any desired configuration, that is, the grooves may be rectangular and the land areas generally triangular, as shown in Fig. 3, or any other suitable configuration may be employed. In order to further increase the air circulation inside a reflector supported on the cones, a plurality of holes **40** may be cut through the support cones in the groove areas.

Four modified forms of support cones are shown in Figs. 4 through 11 inclusive. In describing these modified forms of support cones, similar reference characters to those employed above will be used where applicable with the distinguishing suffixes *a*, *b*, *c*, and *d*, respectively.

In the first modification shown in Figs. 4 and 5 a support cone **24***a* is defined by a hollow generally frusto-conical member having a central sleeve portion **31***a* defining a bore **32***a* for receiving an inserted reduced diameter end portion of a post. For supporting a reflector, the outer surface of the support cone is provided with a plurality of elementally extending ridges **42**. The reflector supporting land areas defined on these ridges may be made relatively narrow and the height of the ridges above the surface of the cone will determine the available passage area for air circulation.

In the second modification (Figs. 6 and 7), a hollow frusto-conical cone support member **24***b* is provided with an internal sleeve portion **31***b* defining a bore **32***b* for receiving an inserted end of a supporting post. The outer annular surface of the support cone **24***b* is provided, as in the previous modification, with a plurality of elementally extending ribs **42***b*. Interspersed between these ribs, however, are a plurality of elongated slots **44** providing a highly open support structure.

The modification shown in Figs. 8 and 9 is employed where the lighting reflector is formed with a long, narrow, tubular neck. Accordingly, the firing cone support must be of a diameter small enough to fit within the neck. To this end the support **24***c*, shown in Fig. 8, comprises a generally frusto-conical member having a bore **32***c* therethrough for supporting the cone on an inserted end of a post. Air circulation through the reflector and the support is provided by a plurality of axially extending slots **45** in the periphery of the cone, four such slots being illustrated.

A further modified form of support cone providing for increased air circulation is shown in Figs. 10 and 11. In this modification the firing support **24***d* comprises a flange **48** having an external frusto-conical annular surface **49** and provided with a plurality of axially extending openings **50**. For mounting the support on a post, the flange is formed with a sleeve portion **51** having a post receiving bore **32***d*. In this instance, while the annular surface is relatively small, it is of sufficient size to engage the edge of the fixture opening in a reflector.

Reflectors are easily mounted or demounted from the firing supports as illustrated in Fig. 1 by simply removing the upper cone and post. When a glazed reflector is placed over the intermediate cone **24**, the upper cone and post are inserted in place and a second reflector is placed on top. If desired, third and fourth tiers can be provided depending upon the available height of the furnace.

In carrying out the method of the present invention, referring to Fig. 1, the reflector supports are placed on the cross bars and the glazed reflectors are placed upon the supports. When the loading area is full the bars and the reflectors which they carry are placed in the furnace for firing. Desirably, a second set of bars is then loaded ready for firing when the first group is completed. Thus a substantially continuous firing process can be performed. When the firing is complete, the fired reflectors are removed from the supports.

It will be noted that the reflectors are supported at their upper ends adjacent the opening which ultimately receives a light fixture. Any blemishes which may occur on this surface will be hidden and sealed by the gasket used between the lamp fitting and the reflector. It can easily be seen that supporting the reflectors in this manner completely eliminates any damage to the lower peripheral edge of the reflector, thus permitting the formation of a smooth undamaged porcelain coating.

I claim as my invention:

1. For use in porcelainizing reflectors a firing stand for supporting at least two reflectors in vertically tiered relation comprising, in combination, a base, a first post section supported by and extending upwardly from said base, a second post section supported by and extending upwardly from said first post section, and at least two reflector supports in vertically spaced relation on said post sections, each of said supports comprising a truncated cone-shaped sleeve member, an inner sleeve fixed to said cone at the smaller end thereof and defining a bore for receiving an inserted end of a post section, and means on the external surface of said cone for supportingly engaging a reflector and for defining an air circulating passage between said cone and the reflector.

2. For use in porcelainizing reflectors, a firing stand for supporting at least two reflectors in vertically tiered relation comprising, in combination, a base, a first post section supported by and extending upwardly from said base, a second post section supported by and extending upwardly from said first post section, and at least two reflector supports in vertically spaced relation on said post, each of said supports comprising a truncated cone-shaped sleeve member, means on said cone at the smaller end thereof for supporting said cone on one end of a post section, and means on the external surface of said cone for supportingly engaging a reflector and for defining an air circulating passage between said cone and the reflector.

3. For use in porcelainizing reflectors a firing stand for supporting at least two reflectors in vertically tiered relation comprising, in combination, a base, a center post supported within and extending upwardly from said base and at least two reflector supports in vertically spaced relation on said post, said supports comprising a truncated

cone having a plurality of elementally extending ridges on the outer surface thereof.

4. For use in porcelainizing reflectors, a firing stand for supporting at least two reflectors in vertically tiered relation comprising, in combination, a base, a center post supported by and extending upwardly from said base, and at least two reflector supports in vertically spaced relation on said post, said reflector supports including means for supportingly engaging a reflector and for defining an air circulating passage between said support and a reflector supported thereon.

5. For use in porcelainizing reflectors, a firing stand for supporting at least two reflectors in vertically tiered relation comprising, in combination, a base, a center post supported in and extending upwardly from said base, and at least two reflector supports in vertically spaced relation on said post, each of said supports comprising a truncated cone having a plurality of elemental ridges on the outer surface thereof and a plurality of apertures extending through said cone intermediate said ridges.

6. For use in porcelainizing reflectors, a firing stand for supporting at least two reflectors in vertically tiered relation comprising, in combination, a base, center post supported within and extending upwardly from said base and at least two reflector supports in vertically spaced relation on said post, each of said supports comprising a truncated cone having a plurality of elemental ridges on the outer surface thereof and a plurality of elemental

apertures extending through the surface of said cone intermediate said ridges.

7. For use in porcelainizing reflectors, a firing stand for supporting at least two reflectors in vertically tiered relation comprising, in combination, a base, a center post supported within and extending upwardly from said base and at least two reflector supports in vertically spaced relation on said post, each of said supports comprising a generally frusto-conical means for supporting a reflector and including means defining air circulation apertures therethrough.

8. For use in porcelainizing reflectors, a firing stand for supporting at least two reflectors in vertically tiered relation comprising, in combination, a base, a center post supported within and extending upwardly from said base and at least two reflector supports in vertically spaced relation on said post, said supports comprising a truncated cone having a plurality of evenly spaced slots therein.

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