A. J. SANFORD.

BURNER FOR FIRE POLISHING GLASSWARE.

APPLICATION FILED JUNE 26, 1909.

962,861. Patented June 28, 1910.

FIG. 4

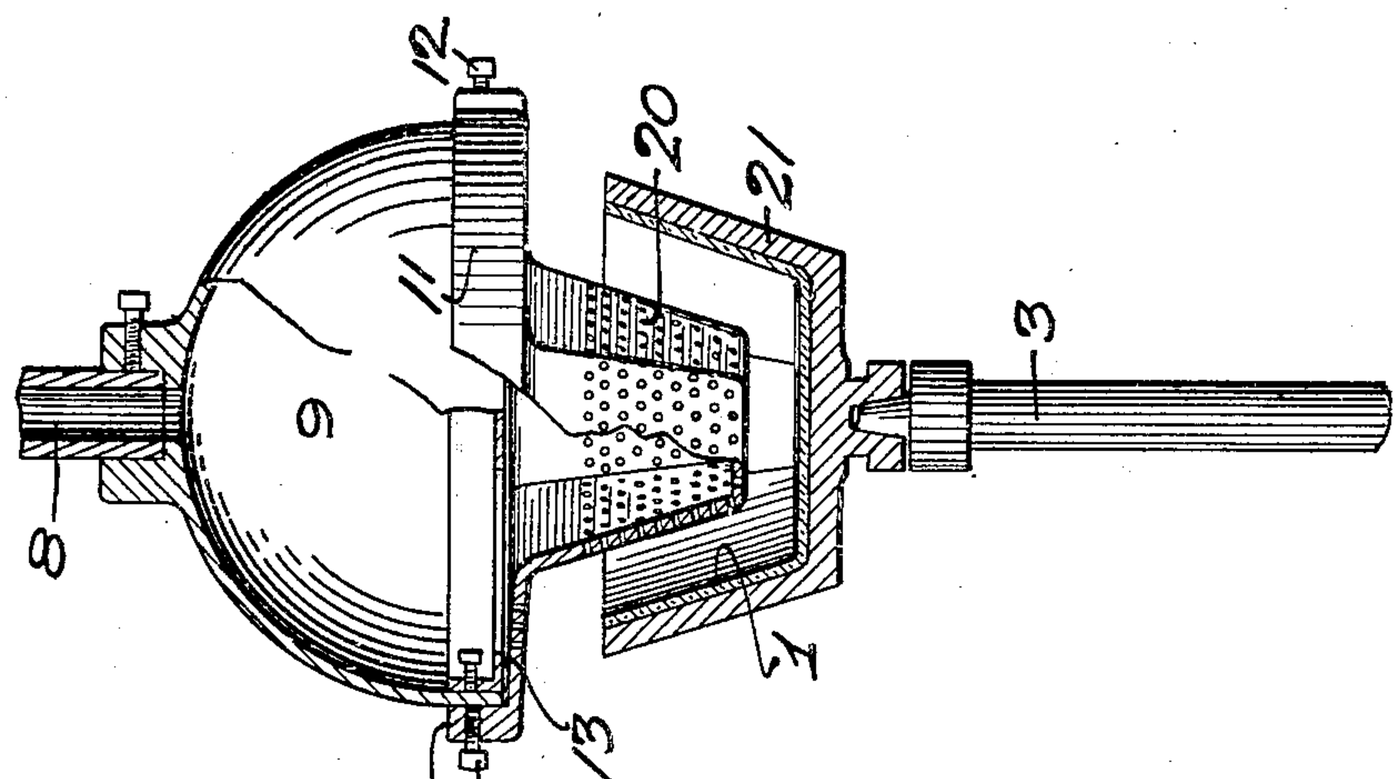


FIG. 3

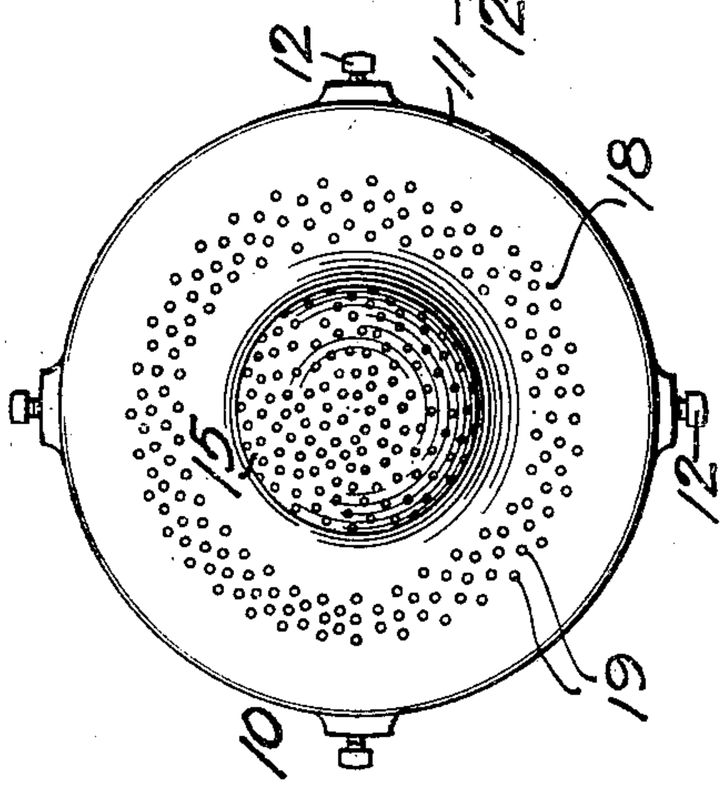


FIG. 2

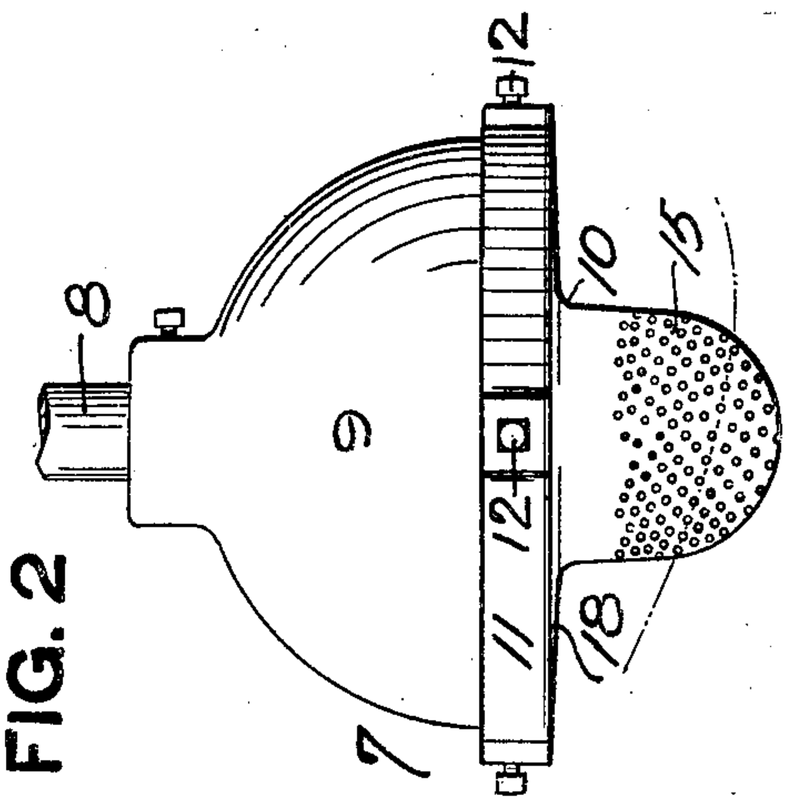
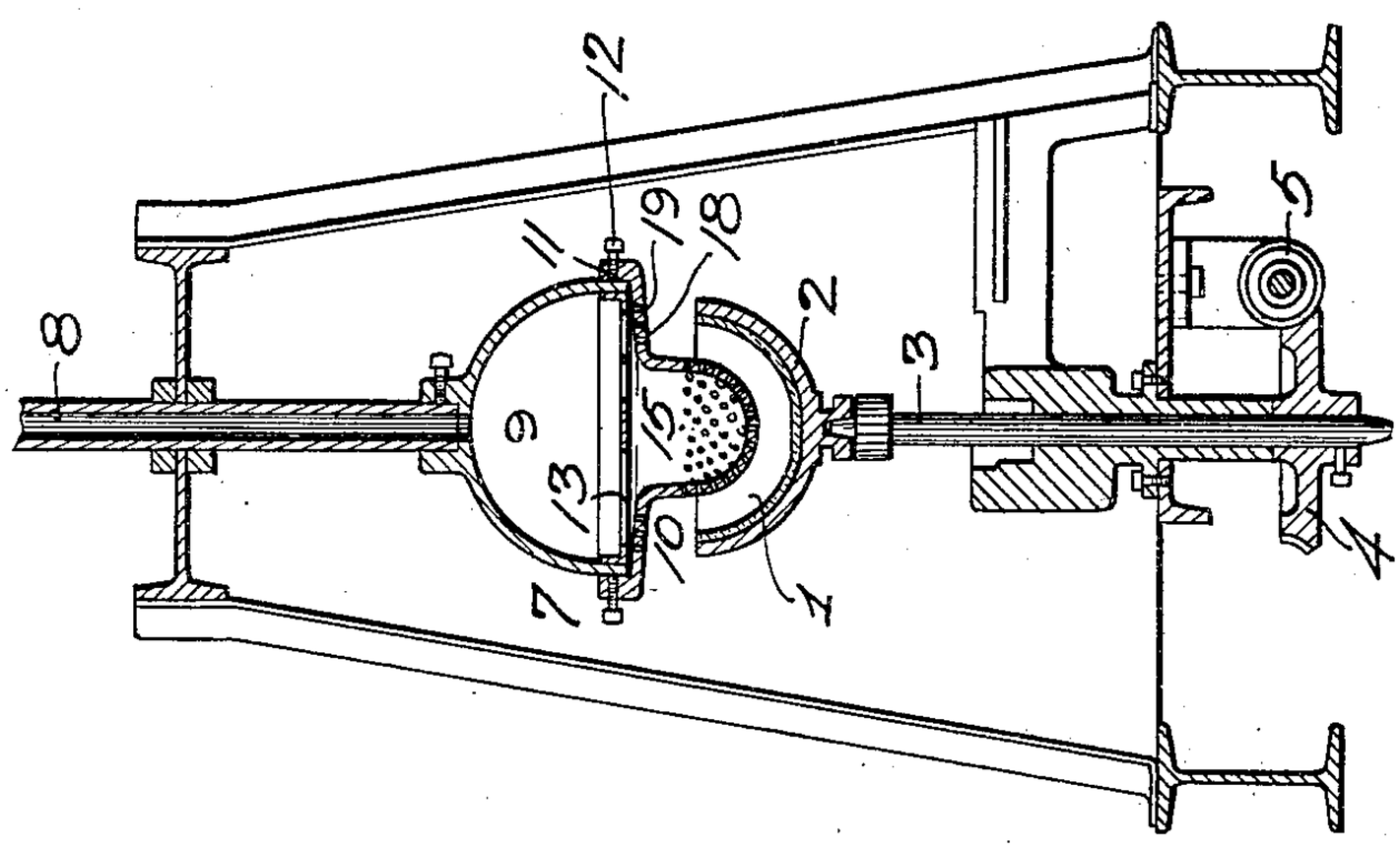


FIG. 1



WITNESSES.

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BURNER FOR FIRE-POLISHING GLASSWARE.

962,861. Specification of Letters Patent. **Patented June 28, 1910.**

Application filed June 26, 1909. Serial No. 504,548.

To all whom it may concern:

Be it known that I, ANDREW J. SANFORD, a resident of Newark, in the county of Licking and State of Ohio, have invented a new and useful Improvement in Burners for Fire-Polishing Glassware; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to apparatus for fire polishing glass articles, and especially to burners for such purpose and the supports for the articles used in connection therewith, its object being to provide a burner suitable for polishing the interior and edge portions of glassware by direct flame action under proper control to play upon the interior surface of the article to be fire polished.

The burner is intended for use in connection with certain methods of fire polishing, as described in applications of even date herewith, Serial Nos. 504,552 and 504,553.

The burner of the present invention consists of a burner body having a cone or central projecting body portion adapted to enter within the article to be polished and having multitudinous jet openings for the escape of mixed gas and air on its bottom and side faces to project small flame jets ignited on the outside of the burner directly upon the interior of the article to be polished, as well as upon the top edge thereof, to secure the proper and even fire polishing of the interior of the article, and also the proper melting of the edges thereof to remove fins and cause proper rounding of such surfaces.

It also includes means to support the article in connection with the said burner and certain other improvements as hereinafter described.

In the accompanying drawings Figure 1 is a section of fire polishing apparatus having my improved burner applied thereto; Fig. 2 is an enlarged side view of the burner body illustrating its preferred construction; Fig. 3 is a face view of the body of the burner; and Fig. 4 is a view of an angular burner for use with angular glass articles.

The invention of the present application relates more particularly to the interior fire polishing of bowls in accordance with the method above referred to as set forth in application Serial No. 504,552, said application describing the two steps, both the exterior polishing of the bowls and the interior polishing thereof, the present invention relating to apparatus for the practice of the latter step. The invention is illustrated in connection with the fire polishing apparatus shown in said application which is well adapted for the purpose, the article to be fire polished being shown at 1 and resting within a suitable concave bowl-shaped support or former 2 carried upon a vertically moving shaft 3 which in its raised position, as shown, is adapted to be rotated by suitable power connections, for instance a worm wheel 4 on said shaft 3 driven by a suitable worm 5. The support 2 may be introduced into place and withdrawn in any suitable way and the shaft 3 may be raised and lowered by any suitable mechanism, this not forming part of the present invention.

The burner 7 is suspended from the air and gas supply pipe 8, air under pressure and gas being supplied thereto in any suitable way. The burner as illustrated consists of the mixing chamber 9, and the burner proper 10, these parts being made of any suitable material, being illustrated as castings. The burner body 10 has the upwardly extending annular lip 11 which fits around the base of the mixing chamber 9 and is held thereto by suitable set screws 12, the joint between the two being packed by any suitable heat resisting packing, for example, by means of an asbestos ring 13 forming a tight joint between the two. The burner body has depending therefrom the central cone or like projecting portion 15 which enters within the hollow bowl or like article, such cone being made to correspond in general shape to the article to be polished, but of smaller size leaving a space between the burner and bowl within which the small flame jets play, the best practice as heretofore developed making this distance about two inches. The surface of the cone projection 15 is covered with multitudinous jet openings, in order to obtain an evenly distributed series of flame jets over a large portion of the cone, at least over the portion thereof which enters within the bowl. Such jet orifices can be arranged in any suitable way to obtain an even distribution of the

jet flames so as to project against the entire surface of the interior of the bowl or like article. I have found that spirally arranged jet orifices give a very successful operation where the article is rotated with relation to the burner, as no part of the surface of the article is permitted to escape contact with the flame, even though small jets are employed, the spiral distribution of the jet orifices over the base and the sides of the burner projection insuring contact of the flame with all parts of the bowl as it is rotated and supported in the former.

It will be noted that the burner proper in addition to its central projecting body portion has the practically flat extension above said central projection, and that the cup or bowl shaped holder 2 in which the blank to be polished is supported when in fire polishing position extends up toward such flat annular portion of the burner. This is a great advantage in fire polishing, as the flame and heat are generated within the bowl, and the flame jets play against the interior thereof, the heat and flame must of course escape and they naturally pass in upward direction until they strike the horizontal body of the burner, when they are deflected outwardly, the result being that the heat and flame play over the edges of the bowl and a very high heat sufficient to melt off any fins and also to melt off the square edges formed in pressing is obtained, so providing for the proper finishing of the edges of the article. To insure the generation of the high heat necessary for this purpose I also form a series of jet openings in the flat body portion 18 of the burner, as at 19, to form flame jets projecting against the top edges of the bowl, insuring the generation of sufficient heat to melt the edges of the blanks. As shown in the drawings I prefer to carry the top edges of the blanks to or close to the top edge of the bowl shaped holder, so that the flame escaping outwardly between the burner body and the support will play over the edges of the blank. As, however, as described in said application Serial No. 504,552 the bowl may be rotated at a high speed in order to cause it by centrifugal action to conform to the shape of the support, the edges of the blank should not extend above the top edge of the bowl shaped support.

In the use of the apparatus as above described the pressed article, as shown at 1, is placed within the bowl support 2, and this support placed upon the top of the shaft 3 which is raised into proper position for fire polishing. It is held in that position until the fire polishing is effected, when the shaft is dropped and the holder withdrawn and the article removed therefrom. In fire polishing as the flame is formed entirely on the outside of the burner the mixed gas and air pass outwardly through the perforations or openings and are ignited on the outside thereof, the air being under pressure and the innumerable flame jets being projected against the interior of the article to be polished, the cone or projection of the former entering within the article and the article being supported at proper distance for the proper play of the flame over the interior thereof, this, as above stated, being usually about two inches. As the article is rotated it is evident that all surfaces of the same come in contact with the flame jets, this being assured by the spiral lay or arrangement of the jet orifices in the cone or projection of the burner. The jet orifices are preferably arranged to project the flame at practically right angles against the surface of the bowl so that on account of the use of the multitudinous jet openings the interior thereof is evenly fire polished, while the flame escaping plays between the top edge of the bowl and its holder and the flat or outwardly extending apron or body 18 of the burner plays over the interior edge portion of the article and so insures the proper melting and rounding of the edge thereof, the heat at this point being also intensified, if desired, by the flame jets from the series of jet orifices in the flat apron portion playing directly upon the edge of the article.

In fire-polishing angular articles, the projection or cone 20 of the burner is made to conform substantially to the shape of the article, as is also the supporting holder 21, and in this case the article is not rotated. This is properly shown in Fig. 4 of the drawing.

What I claim is:

1. A burner for fire polishing glassware having a central projection provided with jet orifices, and beyond the same an outwardly extending apron portion.

2. The combination of a burner having a central projection provided with jet orifices extending through the same and an outwardly extending apron portion above the same, and a support for the article adapted to be held above the projection of the burner.

3. A burner for fire polishing glassware having a central projection adapted to enter within the article and having jet openings formed therein and an outwardly extending apron portion having jet openings formed therein.

4. The combination of a burner for fire polishing glass-articles having a central projection having jet orifices formed therein and an outwardly extending apron portion having jet orifices formed therein, and a

hollow supporting holder for the article adapted to be raised above the base of the burner.

5. A burner for fire polishing glass articles having a series of perforations formed in the jet face thereof, said perforations being spirally arranged.

6. In apparatus for fire polishing glassware, the combination of a burner having spirally arranged jet openings on the jet face thereof and a rotatable support for the article.

In testimony whereof, I the said ANDREW J. SANFORD have hereunto set my hand.

ANDREW J. SANFORD.

Witnesses:

E. J. MORATH,

J. E. SNELLING.