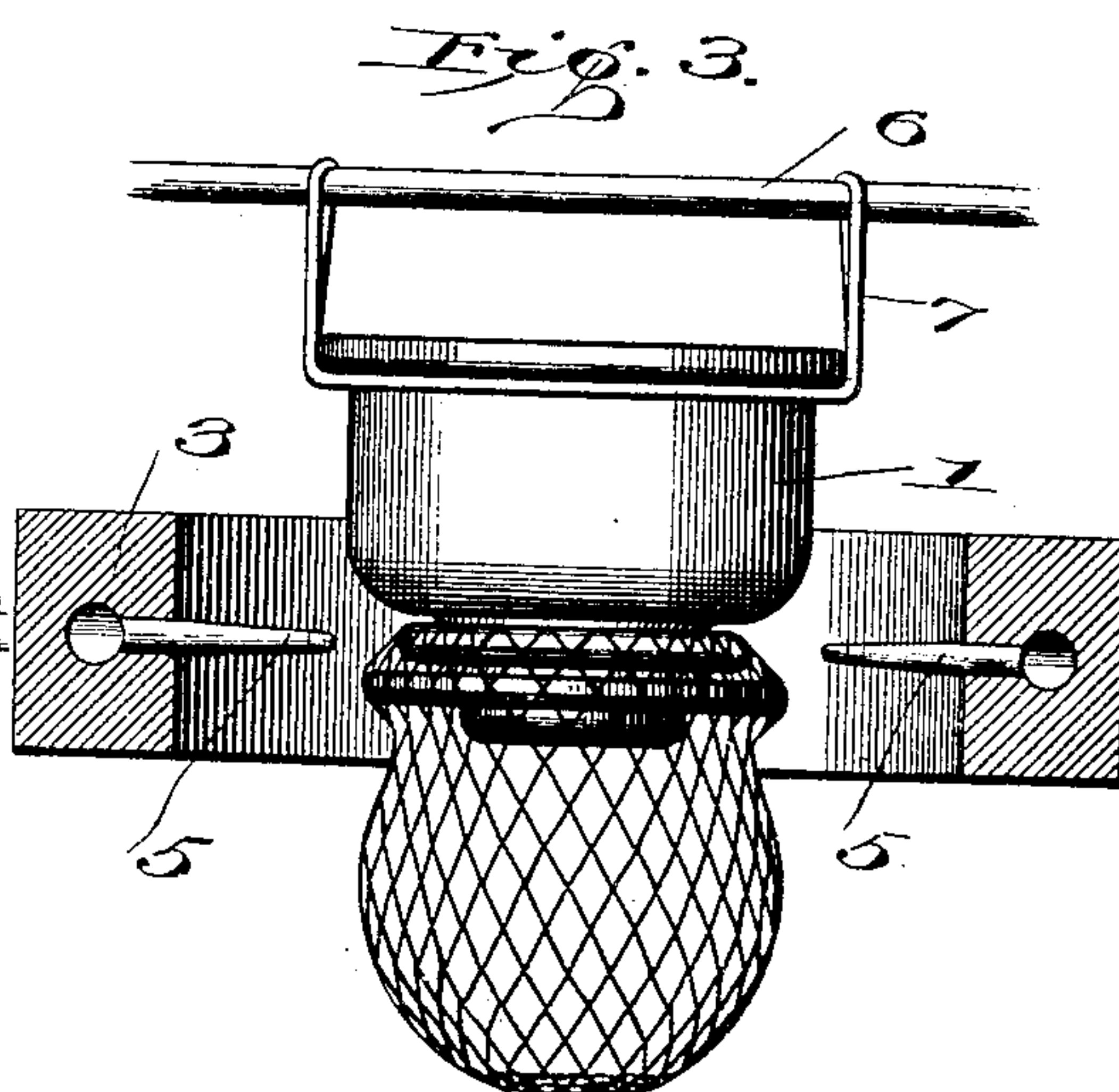
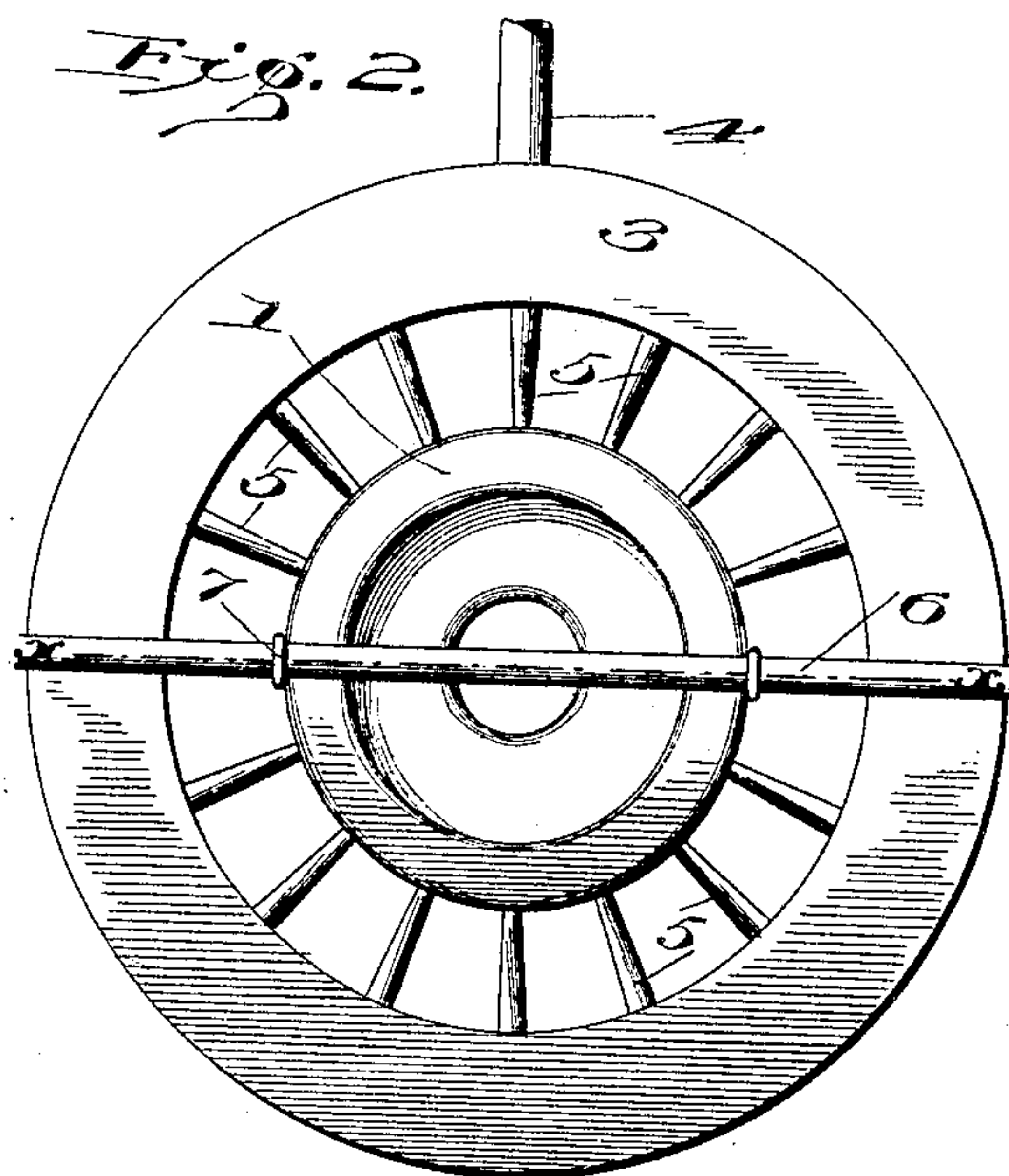
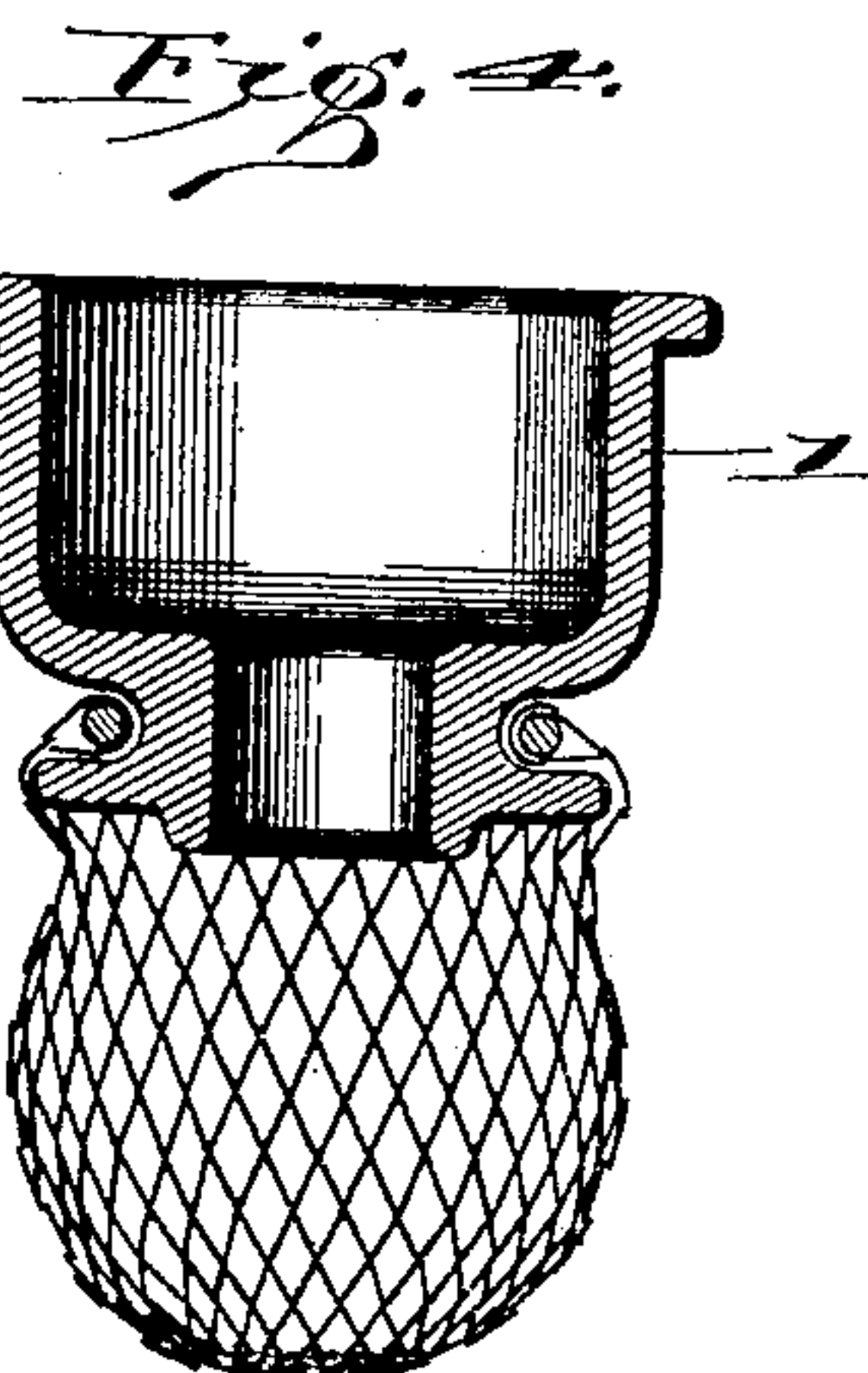
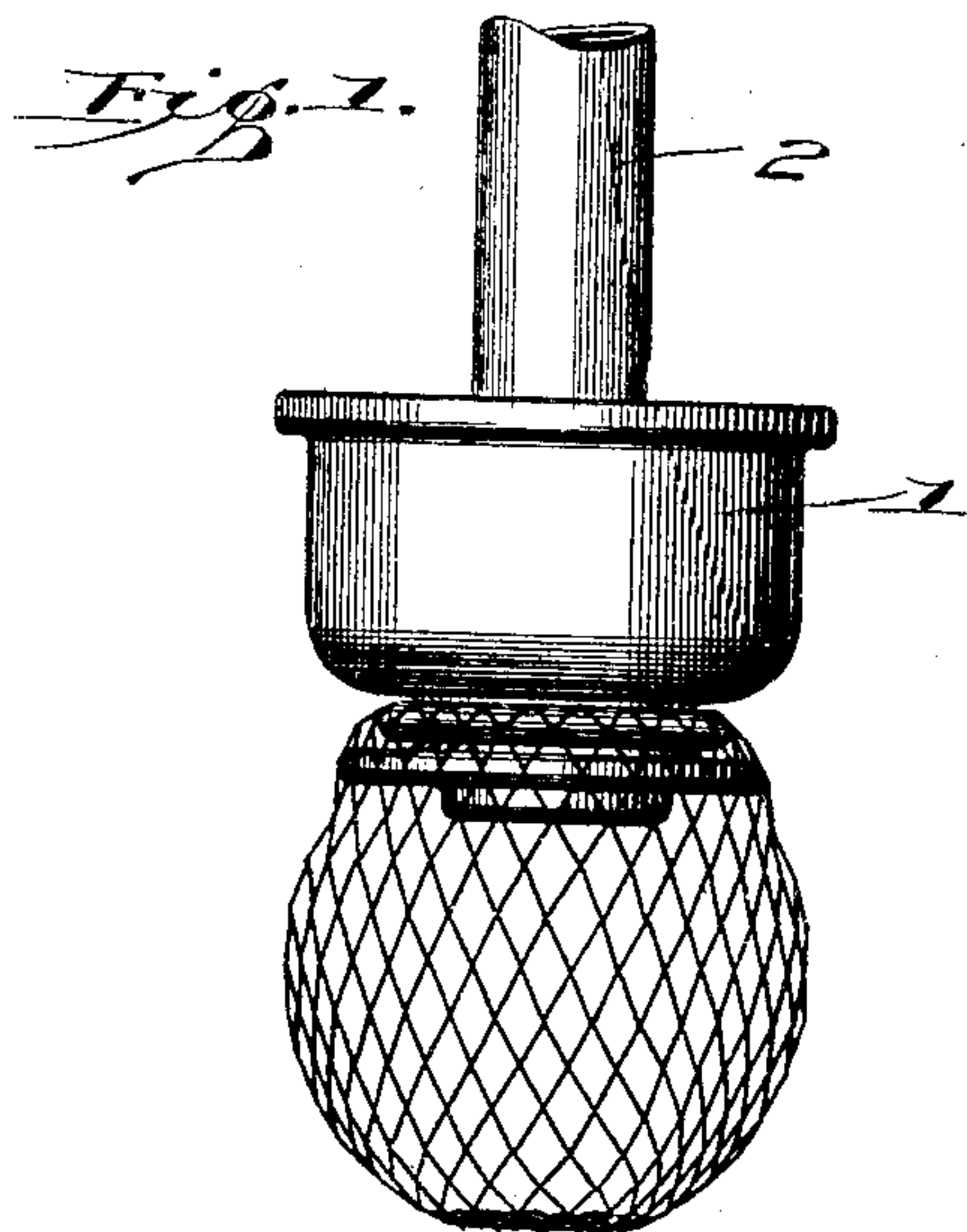


No. 803,915.

PATENTED NOV. 7, 1905.

C. M. LUNGREN.
METHOD OF PREPARING INCANDESCENT GAS MANTLES.

APPLICATION FILED AUG. 12, 1904.



Witnesses
Allen Foose
Robert S. Blair

C. M. Lungren Inventor
By *his* Attorney
Duell, Thompson & Co.

UNITED STATES PATENT OFFICE.

CHARLES M. LUNGREN, OF BAYONNE, NEW JERSEY, ASSIGNOR TO THE
SAFETY CAR HEATING & LIGHTING COMPANY, OF NEW YORK, N. Y.,
A CORPORATION OF NEW JERSEY.

METHOD OF PREPARING INCANDESCENT GAS-MANTLES.

No. 803,915.

Specification of Letters Patent.

Patented Nov. 7, 1905.

Application filed August 12, 1904. Serial No. 220,475.

To all whom it may concern:

Be it known that I, CHARLES MARSHALL LUNGREN, residing at Bayonne, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Methods of Preparing Incandescent Gas-Mantles, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to the preparation of incandescent mantles for gas-lamps.

One of the objects thereof is to provide a method whereby a mantle may be prepared which while retaining a smooth and uniform outer surface is nevertheless strengthened and reinforced in those parts in which it is subjected to the greatest stresses in use.

A specific object is to provide a method of preparing a mantle which is hardened at its supporting end and shall have a smooth, uniform, and flawless surface.

Another object is to provide a process especially adapted for use in the final preparation of a mantle in which a certain part, as the crown thereof, is of thicker material than the remainder, and hence is more slowly susceptible to the action of certain treatment.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the several steps and the relation and order of one or more of these steps with relation to each of the others thereof, which will be exemplified in the process herein described, and the scope of the application of which will be indicated in the following claims.

It may here be noted that in the preparation of mantles for incandescent lamps there is a tendency of the same to shrink unequally and to become wrinkled and even to tear in the shrinking process. The latter tendency is especially marked if the several parts of the mantle are not uniform in thickness. There is also a tendency to insufficiently burn or heat that portion of the mantle upon which it is supported, owing to the fact that the member upon which it is mounted tends to carry away the heat from this part, as well as for other obvious reasons. The above and other defects in former processes are remedied in that hereinafter described.

Referring now to the drawings, in which

are illustrated some of the steps of the process herein described, together with one of various possible forms of apparatus for carrying on the same, Figure 1 is a side elevation of a mantle mounted upon a burner, showing the parts at one stage of my process. Fig. 2 is a plan showing the parts at another stage. Fig. 3 is a sectional elevation taken through the center of Fig. 2. Fig. 4 is an elevation of the mantle in finished form.

Similar reference characters refer to similar parts throughout the several views.

This process is especially designed to be used in connection with the mantles described in my copending application filed of even date herewith, Serial No. 220,476, in which application certain features of invention are claimed which are shown and described but not claimed herein. It may here be noted that the mantle for the preparation of which this process is especially adapted has a thickened crown or apex formed by the use of thicker material or fabric at that point. Owing to this inequality in the thickness of this mantle certain difficulties and complications arise in its preparation which it is one of the aims of this invention to surmount.

With a mantle of the above or any other desired form after it has been impregnated and dried it is preferably roasted in a crucible which has been heated to a bright red. By the word "roasted" as used throughout this description and in the following claims is meant a process of heating in which the object heated is not exposed to the direct action of the flame or other products of combustion and in which the heat is preferably conducted through the walls of a crucible or like receptacle. "Roasting," as above defined, is preferred at this point to direct exposure to a flame, as the sudden shrinkage of the thinner parts, which would be rapidly burned as a result of such exposure, would tend to tear them from the more slowly burning thicker part, as, in this case, the crown. After the roasting process has been carried to such an extent that the cotton base of which the mantle is formed is entirely burned out in the thinner parts it is removed from the crucible in a glowing condition and the thicker parts are permitted to slowly burn out in the air. This method of procedure is followed, as it has been found that if the mantle is retained in the crucible

until all of the carbonaceous matter is burned out of the same there is a tendency of the thinner parts—as, in this case, the body of the mantle—to shrink and tear away from the remainder thereof, as above noted.

After the carbonaceous matter has been entirely oxidized and the mantle is in a partially shrunken and somewhat distorted form it is mounted, by means of a spool 1, upon an ordinary burning-out burner 2, upon which it is subjected to the direct action of a flame. The word “flame” as used throughout this specification and in the following claims occurs in its ordinary sense as referring to the incandescent gaseous products of combustion. This burning-out burner is similar to that upon which the mantle is used in practice and differs mainly in that the gas or other material is under considerably greater pressure than that with which it is afterward used, and the temperature of the same is consequently somewhat higher. The mantle is exposed to this flame until it has been shrunk to the desired form and has acquired the proper shape and a smooth outer surface.

After reaching the desired condition in the above-mentioned stage of this process it has been found that the end of the mantle by which it is mounted upon the burner has been insufficiently heated, owing to the tendency of the burner or other object upon which it is mounted to conduct the heat away from the same. For this reason and in order more thoroughly to harden this portion of the mantle which is subjected in use to severe stresses it is desired to expose the same to the action of an intensely-hot flame. This is preferably accomplished in the following manner: Referring to Fig. 2 of the drawings, 3 represents an annular conduit which is supplied with gas by means of connection 4. The inner edge of the annular conduit 3 is perforated, as shown, by a series of flat openings or slits in which are positioned burners 5. By means of this apparatus a series of converging jets of flame are forced inwardly in a radial direction from burners 5 and form substantially a sheet of flame of high temperature. Within this sheet is suspended the mantle, together with its immediate supporting member 1, by any desired means, as from rod 6 by means of wires 7. The mantle is held at such a height as to direct the flame upon the desired parts thereof, and this extreme heat completes the shrinkage and tends to harden this part of the mantle. The mantle is now completely prepared and may be dipped in varnish for packing in a well-known manner.

It will thus be seen that I have provided a process whereby a mantle may be prepared which is simple and easily carried on and will result in a mantle having a smooth outer surface in which there are no flaws or tears and which is especially adapted to be used in a position with its free end depending below

its point of support. It will also be noted that all parts of the mantle are thoroughly burned out, yet the shrinking is even throughout the whole of the same.

The apparatus used in carrying out my process is simple and inexpensive and may be used by comparatively unskilled labor.

As my process could be carried on with widely-different apparatus or by manipulation in whole or in part and is valuable in other relations without departing from the scope of my invention, I intend that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

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

1. The method which consists in first subjecting a mantle of varying thickness to a source of heat until the carbonaceous matter in the thinner portions of the same is burned out, and then removing it from said source of heat in a glowing condition and permitting the remaining carbonaceous matter to burn out.

2. The method of preparing a mantle which consists in partially oxidizing the same, then slowly completing the oxidation and afterward exposing the same to the direct action of a flame.

3. The method which consists in first subjecting a mantle of varying thickness to the direct action of a source of heat until the carbonaceous matter in the thinner portions of the same is burned out, removing the mantle from said source of heat in glowing condition and permitting the remaining carbonaceous matter to burn out, and afterward exposing the same to the direct action of a flame.

4. The method which consists in first roasting a mantle of varying thickness until the carbonaceous matter in the thinner portions of the same is burned out, removing the mantle from the roasting means and permitting the remaining carbonaceous matter to burn out, and afterward subjecting it to the direct action of a flame.

5. The method which consists in first roasting a mantle of varying thickness until the carbonaceous matter in the thinner portions of the same is burned out, removing said mantle from the roasting means in a glowing condition and permitting the remaining carbonaceous matter to burn out, mounting the same upon a burner and exposing the same to the direct action of the flame thereof.

6. The process of preparing a lamp-mantle which consists in independently hardening one end of the same.

7. The process which consists in first roasting a mantle, afterward subjecting it to the direct action of a flame, and then independently hardening one end of the same.

8. The process of preparing a lamp-mantle

which consists in first subjecting the same to the indirect, and afterward to the direct action of a source of heat and independently hardening one end of the same.

5 9. The process which consists in first subjecting a mantle of varying thickness to a source of heat until the carbonaceous matter in the thinner portions of the same is burned out, removing said mantle in a glowing condition from said source of heat and permitting the remaining carbonaceous matter to burn out, and afterward independently heating one end of the same.

10 10. The process which consists in first subjecting a mantle of varying thickness to a source of heat until the carbonaceous matter in the thinner portions of the same is burned out, removing said mantle in a glowing condition from said source of heat and permitting the remaining carbonaceous matter to burn out, exposing the entire mantle to the direct action of a jet of flame, and afterward independently heating one end thereof.

15 11. The process of preparing a lamp-mantle which consists in quickly and incompletely oxidizing the same, then more slowly completing the oxidation, and afterward independently hardening one end of the same.

20 12. The process of preparing a lamp-mantle which consists in quickly and incompletely oxidizing the same, then more slowly completing the oxidation, exposing said mantle to the direct action of a source of heat, and independently hardening one end of the same.

25 13. The method which consists in first subjecting a mantle of varying thickness to the indirect action of a source of heat until the carbonaceous matter in the thinner portions

thereof is burned out, removing said mantle in a glowing condition from said source of heat and permitting the remaining carbonaceous matter to burn out, exposing said mantle to the direct action of a source of heat, and independently heating one end of the same.

45 14. The process which consists in roasting a mantle of varying thickness until the carbonaceous matter in the thinner portions thereof is burned out, removing said mantle from the roasting means in a glowing condition and permitting the remaining carbonaceous matter thereof to burn out, exposing the entire mantle to the direct action of a jet of flame, and independently heating one end thereof.

50 15. The process which consists in roasting a mantle of varying thickness until the carbonaceous matter in the thinner portions thereof is burned out, removing said mantle from the roasting means in a glowing condition and permitting the remaining carbonaceous matter thereof to burn out, exposing the entire mantle to the direct action of a jet of flame, and independently heating the end of said mantle by which it is secured to the member upon which it is mounted.

65 16. The method of preparing a mantle which consists in quickly oxidizing certain predetermined portions of the same and then more slowly oxidizing certain other predetermined portions.

70 In testimony whereof I affix my signature in the presence of two witnesses.

CHARLES M. LUNGREN.

Witnesses:

H. S. DUELL,

H. M. SEAMANS.