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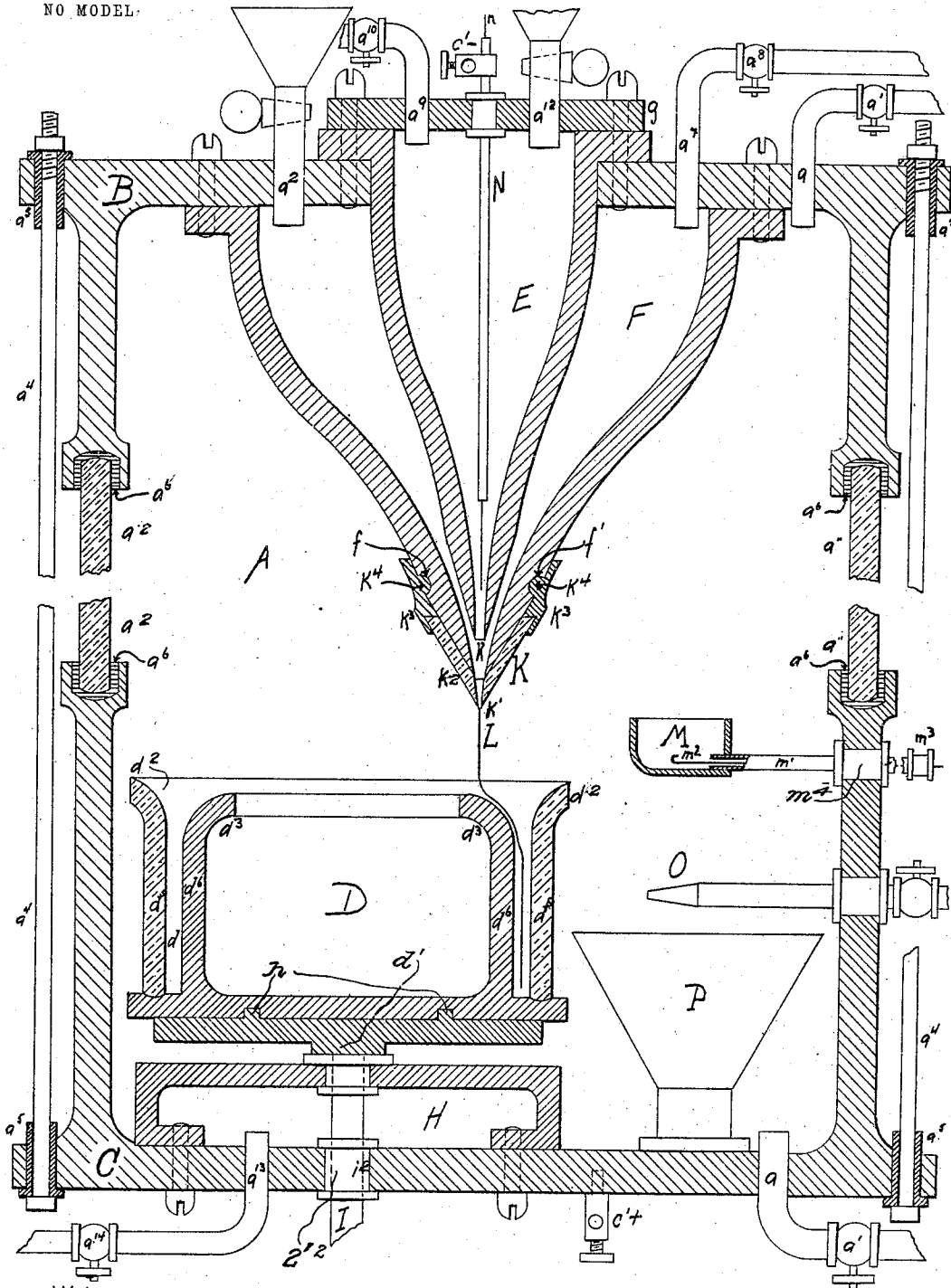
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PROCESS OF MANUFACTURING GLOWERS, LUMINANTS, AND FILAMENTS
FOR ELECTRIC INCANDESCENT LAMPS.

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NO MODEL.



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PROCESS OF MANUFACTURING GLOWERS, LUMINANTS, AND FILAMENTS FOR ELECTRIC INCANDESCENT LAMPS.

SPECIFICATION forming part of Letters Patent No. 772,215, dated October 11, 1904.

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To all whom it may concern:

Be it known that I, FRANCIS M. F. CAZIN, a citizen of the United States, residing at 1108 Bloomfield street, in the city of Hoboken, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Processes of Manufacturing Glow-
5 ers, Luminants, and Filaments for Electric Incandescent Lamps, of which the following is a specification.

My present invention relates to a new and improved method or process of manufacturing luminants or filaments for electric incandescent lamps in which said luminants are
15 composed of a plurality of preferably concentrically arranged layers of different materials, some of which are adapted to serve as core and others as cover portions. Generically my invention seeks to provide a new and improved
20 method of forming such fillets by a squirting process, whereby the various substances going to form the complete lamp are simultaneously squirted into their proper correlative positions and at the same time formed into their lineal
25 shape. Again, my invention seeks to produce a fillet either of a solid formation in cross-section or of a tubular formation with one or more central or longitudinal channels with or without pores.

30 With other objects in view, which will be hereinafter made apparent, the invention includes certain novel steps and method of operation, all of which will be first described in detail and then specifically pointed out in the
35 appended claims; reference being had to the accompanying drawings, which show an apparatus for carrying out my process in vertical longitudinal section.

Referring now to the drawings, in which
40 like letters of reference indicate like parts in the figures, A represents the bell-jar of an air-exhausting apparatus to which are connected by means of pipes a , having valves a' , all the requirements and paraphernalia now
45 commonly known in the art for performing the desired function of such apparatus to exhaust the bell-jar. The particular formation in horizontal section of the bell-jar is not an

essential feature of the invention, as any desired form thereof may be used as found most
50 desirable. The bell-jar and the bolts which hold the top, middle, and bottom parts together are shown as broken apart to indicate that the middle part of the apparatus as such is intended to have greater vertical length
55 than is possible to show in the drawings, the middle portion a^2 being partly constructed of glass sufficient to afford a full view of the inside of the apparatus. The advantages of having such middle part a^2 constructed of glass
60 are twofold—namely, that the fillet as it is taken up by the moving coiler D can be observed by the operator at any time and that the said middle part will serve as electrical insulation between the top part B and the bot-
65 tom part C of the bell-jar A. To provide for hermetically joining the various parts together, I provide packing-rings a^6 , as shown in the drawings.

The top part B of the bell-jar A serves as the
70 supporting member for the two squirting-receptacles E and F. The top B has a large central aperture through which the receptacle E is inserted, and the said top B has other
75 smaller perforations to permit passage of the bolts a^4 and their insulating-bushing a^5 . The top B also has apertures to permit passage of the screws which fasten the receptacle E and its cover G to the top B.

a designates pipes communicating with the
80 interior of the bell-jar A and which connect with the exhausting apparatus, (not shown,) they being controlled by the valves a .

a^7 designates a pipe controlled by a valve
85 a^8 , which communicates with the receptacle F, and which is connected with any suitable pressure-producing apparatus whereby the contents of the receptacle F can be forced out of its squirting-mouth at the will of the oper-
90 ator.

a^9 designates a pipe controlled by a valve
95 a^{10} and communicating with the pressure-producing apparatus (not shown) to force the contents of the receptacle E out of its squirting-mouth.

The materials to be squirted are fed to the

receptacles E and F, respectively, through funnel members a^{11} a^{12} , which communicate with the receptacles E and F, respectively.

5 Passing through the top g of the receptacle E is a tube N, through which passes the cleaning, stopping, and calibrating needle n , and this tube is preferably suitably insulated from the top g by an insulating-bushing, as shown.

10 c' designates an electrical contact-terminal connected with the tube, by means of which the negative leader-wire from any suitable source of current-supply may be attached, the positive leader-wire of the current-supply being
15 connected to the positive terminal member c' , fastened to the bottom member C of the bell-jar. By arranging the positive and negative terminals as shown during the operation of the apparatus a current of electricity can
20 be passed through the fillet L as it is being produced and coiled partially for testing and controlling purposes, but mainly for producing moderate heat therein for the purpose of drying and hardening as well as causing slow
25 chemical reactions in the fillet as it is being produced.

C represents the bottom part of the bell-jar, through which pass hermetically two pipe connections, one of which, a , leads to any
30 suitable air-exhausting mechanism, while the other, a^{13} , leads to any suitable steam-producing apparatus, (not shown,) and this pipe a^{13} is controlled by the valve a^{14} . The bottom plate C, as shown in the drawings, is constructed integrally with an upright wall
35 portion of the bell-jar; but I desire it understood that the bottom plate and the upright part or parts may be constructed of different or separated parts as long as they are hermetically
40 ally connected to allow air-exhausting of the bell-jar.

I designates a shaft passing through the stuffing-box i^2 , to the end of which shaft a
45 coiler mechanism D is coöperatively connected, the coiler mechanism including a deep groove d , into which the squirted fillet L is adapted to coil, the coiler D being moved in the required direction by means of the shaft
50 I, so as to coil the fillet at the same velocity at which it is received from the mouthpiece of the squirting-receptacles E and F. The mouth of the groove d is widened out to allow for possible irregularity in speed or direction of the coiling-fillet L. When desired, the
55 groove d may be filled with some suitable liquid for acting upon the fillet L or serving as a preservative therefor, provision being made for the overflow of the said liquid as the groove is filled with the fillet in making the
60 central part of the coiler D hollow to receive such overflowing liquid.

While I have shown in the drawings the simplest method of applying motion to the coiler D, it being set concentrically or eccentrically on a revolving platform and being

held in position by pins h on the platform, which enter indentures in the bottom of the receptacle B, yet I desire it understood that other modifications of coiler-moving parts may be made or used in connection with my
70 apparatus, depending upon the formation desired in the finished luminant. When a coiler such as shown in the drawings, having a simple revolving motion, is used, the curved portions d^2 d^3 at the top of the receptacle D are
75 relied upon to guide the fillet L into its proper position in the groove d , it being understood that all points in the line of its curve are successively brought in close proximity to or under the mouths k k' of the squirting-recep-
80 tacles.

The outer wall d^5 of the coiler D is shown constructed of glass and as being removable, so that the coiled fillet is observable at all
85 times. When, however, the outer wall d^5 is removed, it not being desired to fill the groove d with the liquid, then the coiled fillet will be readily exposed to permit more rapid drying in the rarefied air. To prevent sticking to-
90 gether of the several coils, when no liquid bath is used for that purpose and when the outer wall d^5 is not in use, I provide a dust blower or injector O for admitting pulverized material into the bell-jar to cover or coat
95 the fillet as it is coiled upon the coiler.

Although I may make the inner portions d^6 integral with the turn-table, yet I prefer to make it independently thereof, as shown in the drawings, to permit of readily removing
100 the finished coiler from the apparatus and for substituting new coiler-receptacles on the turn-table as the previous one has become filled with the fillet.

The primary form of the coil consists of continuous curves or of straight parts, joining
105 in more or less sharp angles, finally depending on the contour of the groove g^2 , in which the fillet L is made to fall and settle by the laterally-guiding mouthpiece d^2 d^3 or by means of a specific motion applied to the
110 coiler-receptacle D, which brings all points in the said contour directly under the mouth of the squirting-receptacle.

As before mentioned, the receptacle E is provided with means for admitting the material thereto and also means for admitting
115 compressed air to the squirting material. While one squirter-receptacle E is shown as located within the other, F, I do not desire to limit myself to such particular arrange-
120 ment, as the said receptacles may be arranged independently of each other so long as their mouths K are arranged with respect to each other with the two mouths so proximate to one another that the fillet may be twisted to
125 a cord and properly guided into the coiler. I also desire it understood that while I have shown two squirter I do not desire to preclude the use of a single squirter located to
130 squirt within the mouth of a bell-jar. The

outer squirter F is shown as having its mouth k' and mouthpiece K disposed directly below that of the inner receptacle E, thereby causing the squirted material of both receptacles
5 to leave them under pressure applied and adequately regulated as a single complete fillet. From practical experience I have found that to obtain the best results possible the materials to be squirted should be in a syrupy
10 or semiplastic state, brought thereto from otherwise plastic material by means of one or more readily evaporating or admixing liquids.

While the pipes $a^5 a'$ are primarily designed for the admission and the cocks or
15 throttle-valves $a^8 a^{10}$ for regulating the quantity of compressed air admitted, it should also be understood that they may be connected with the steam-supply for the admission of steam to maintain the materials in the receptacles in their semiplastic condition as well
20 as serving to eject the same at the desired time. When steam is used to maintain the material in their semiplastic or syrupy condition, care should be taken that the condensed water will not have a detrimental
25 effect upon and will not mix with the material to be squirted.

H represents a metallic vessel intended to serve as a steam-radiator or as a charcoal-burner and performing the function of radiating heat into the bell-jar, and particularly into the space into which the fillet is being squirted, the admission of steam to the radiator H being provided for in the pipe a^{13} and
35 its controlling-valve a^{14} , before referred to.

K represents a special calibrating mouthpiece with which one or both squirters may be provided and which is made up of two functional parts—namely, the mouthpiece k
40 and the partly-split ring k^3 , having inwardly-projecting portions k^4 , which fit into the indentures $f f'$ of the receptacle-wall.

M represents a fillet-interceptor consisting of the receiver m , the connecting-tube m' , and the hook m^2 , which passes through the tube m' and has its outer end attached to a stopper
45 inserted into the mouthpiece m^3 of the tube m' , and the said tube m' passes through a stuffing-box m^4 in the wall of the bell-jar.

To collect the excess dust ejected by the graphite or other dust ejector O, I provide a suitable dust-collector P, as shown.

Having thus described the construction of the apparatus, the method of operation can be best explained as follows: The mouths of the squirters having been calibrated and the different plastic liquid materials filled into the squirted receptacles with all connections closed, the cover G, secured on and the needle
55 n closing the squirter-mouths, air or steam pressure is then put on by opening the portions $a^8 a^{10}$. Then the needle n is raised to give a squirter-aperture to both squirters of properly-regulated dimensions in cross-section.
65 The sampler M is used to withdraw samples

of the fillet, and the said samples are examined to determine when the fillet is of proper size and composition, the desired corrections being made by movement of the needle n and the proportionate thickness of the two materials
70 being regulated by the pressure applied to either or both of the materials held in the receptacles E and F. When a satisfactory sample has been obtained, the sampler is withdrawn, the shaft I made to revolve at proper
75 speed by any suitable mechanical means, (not shown,) and the vessel H is heated. Finally, the cock or cocks a' are opened and the bell-jar exhausted.

As an example of the materials which I may
80 use in composing my improved luminant I specify metals, carbon, rare metal oxids, metal alloys, metals of the ruthenium-osmium class, &c. The various materials or group of materials are used as the occasion may re-
85 quire.

From the foregoing description, taken in connection with the accompanying drawings, it is thought the advantages and different steps of my method or process will be readily
90 apparent by those skilled in the art to which it appertains, and I desire it understood that the process so disclosed, consisting of a series of steps of operations, may be used regardless
95 of serial order and one or more of such steps may be omitted or duplicated, and they may be made to depend upon pneumatic, electric, or mechanical action or the operations may be made simultaneous, so long as the desired
100 product is produced.

That which I desire to secure by patent is—

1. The process of preparing luminants for incandescent lamps, consisting in squirting suitable material into the inner air-evacuated space of the bell-jar of an air-exhausting
105 apparatus, drying the so-squirted fillet by means of the rarefaction of the air within the bell-jar and forming the said portions into the desired longitudinal shape, substantially as set forth.

2. The process of manufacturing fillets or glowers for electric lamps, consisting in squirting suitable material into the inner space of the bell-jar of an air-exhausting and rarefying
115 apparatus and simultaneously air-exhausting said bell-jar.

3. The process of producing a fillet or glower consisting in squirting suitable material out of a plurality of fillet-squirters into the bell-jar of an air-exhausting apparatus and simultaneously
120 air-exhausting said bell-jar.

4. The process of producing fillets or glowers consisting of squirting a prospective glower or fillet out of a plurality of fillet-squirters, incorporating such materials into a
125 single fillet or glower within the bell-jar of an air-exhausting apparatus while simultaneously air-exhausting such bell-jar.

5. The process of making fillets or glowers consisting in squirting them into a groove of
130

a coiler and so moving the coiler as to form the so-squirted fillet into its final lineal form.

6. The process of manufacturing fillets consisting in squirting material into a fillet shape
5 into the inside of the bell-jar of an air-exhausting apparatus and simultaneously coiling the same and simultaneously air-exhausting the bell-jar.

7. The process of manufacturing glowers
10 consisting in simultaneously squirting a core and a cover therefor into a bell-jar of an air-exhausting apparatus air-exhausting said bell-jar.

8. The process of preparing glowers for
15 electric incandescent lamps, consisting in simultaneously squirting a core and a cover therefor and coiling the same into the shape it is desired to assume in the lamp, and simultaneously drying the same by means of rarefied
20 air.

9. The process of manufacturing electric-incandescent-lamp glowers consisting in simultaneously squirting into a chamber a core and cover therefor, and forming the said squirtd
25 parts into their final shape, and simultaneously exhausting said chamber, for the purposes specified.

10. The process of preparing luminants for
30 suitable material into the inner air-evacuated

space of the bell-jar of an air-exhausting apparatus, drying the so-squirtd fillet by means of the rarefication of the air within the bell-jar, forming the said squirtd material into the desired longitudinal shape and simultaneously covering the squirtd material with
35 dust.

11. The process of manufacturing fillets or glowers for electric lamps, consisting in squirting suitable material into the inner space of a
40 bell-jar, simultaneously air-exhausting said bell-jar and injecting dust into the bell-jar to cover the squirtd material.

12. The process of producing a fillet or glower consisting in squirting material out of
45 a plurality of fillet-squirters into a bell-jar of an air-exhausting apparatus, air-exhausting said apparatus and covering the squirtd material with dust.

13. The process of manufacturing glowers
50 for electric incandescent lamps, consisting in simultaneously squirting material into a fillet shape into a bell-jar, air-exhausting said bell-jar and simultaneously coiling the squirtd fillet into its final shape and covering the same
55 with dust.

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