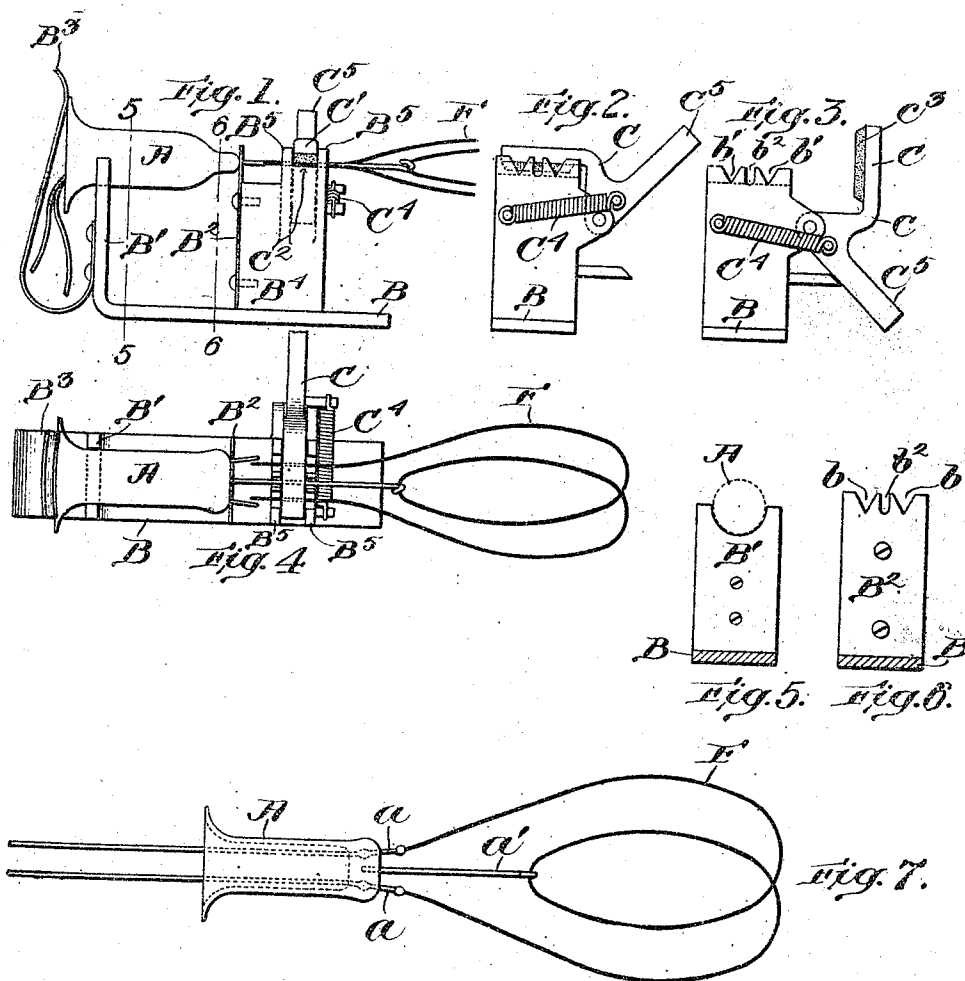


963,234.

Patented July 5, 1910.
2 SHEETS—SHEET 1.



Witnesses:
Geo. N. Goddard
Katherine A. Dugan

Inventor:
Norman Marshall
by
Ira L. Fish Attorney.

968,234.

Patented July 5, 1910.
2 SHEETS—SHEET 2.

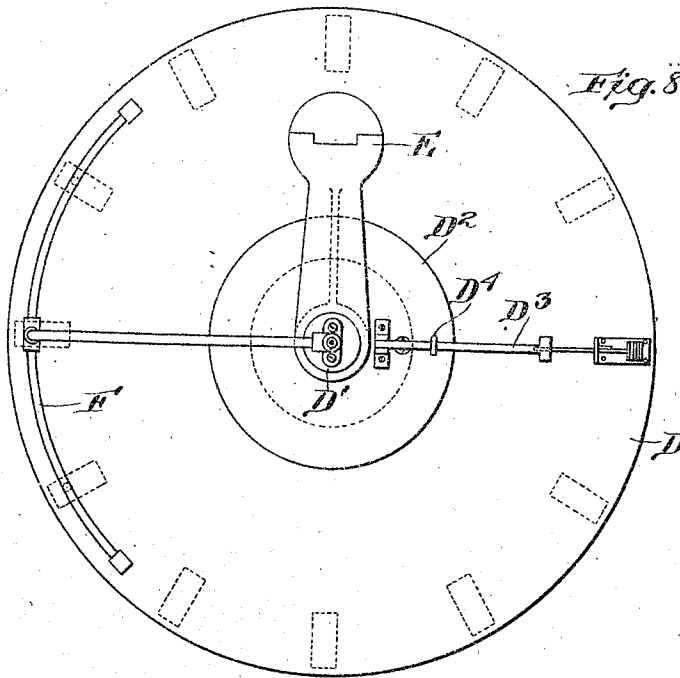


Fig. 8.

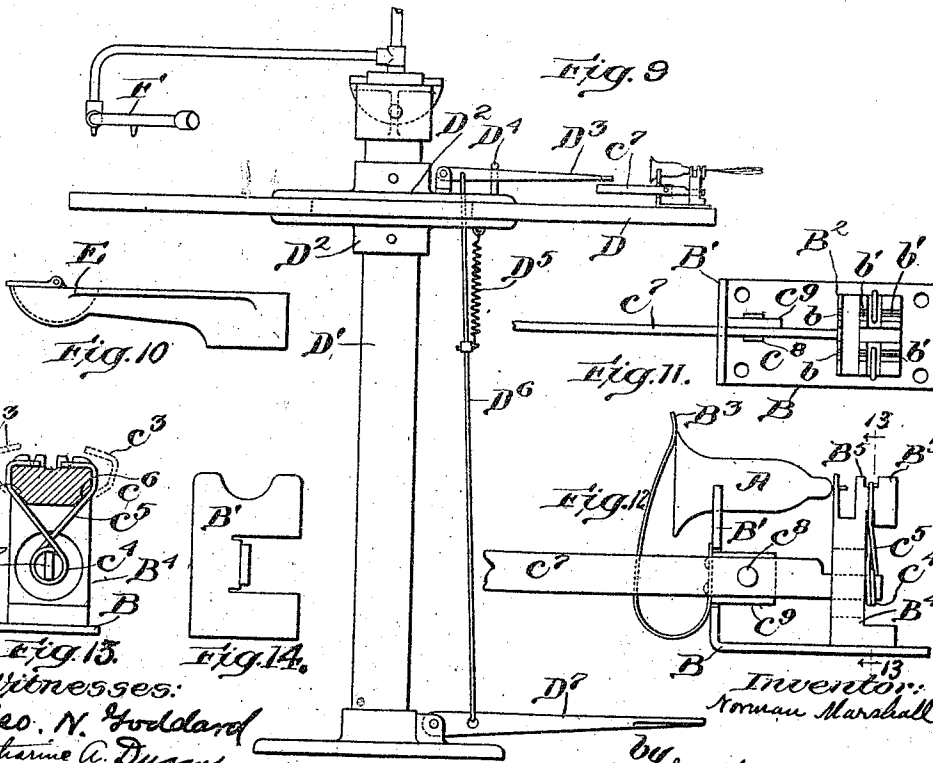


Fig. 9.

Fig. 10.

Fig. 11.

Fig. 12.

Fig. 13.

Fig. 14.

Witnesses:
Geo. N. Goddard
Katherine A. Dugan

Inventor:
Norman Marshall

by
J. L. Fulk Attorney.

UNITED STATES PATENT OFFICE.

NORMAN MARSHALL, OF NEWTON, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

CEMENTING-MACHINE.

963,234.

Specification of Letters Patent.

Patented July 5, 1910.

Application filed January 22, 1906. Serial No. 297,157.

To all whom it may concern:

Be it known that I, NORMAN MARSHALL, a citizen of the United States, and resident of Newton, county of Middlesex; Massachusetts, have invented certain new and useful Improvements in Cementing-Machines, of which the following is a specification.

My invention relates to an apparatus or device for use in cementing the filaments of incandescent electric lamps to the wires which extend through the glass stem of the lamp, its object being to provide means whereby the securing of the filaments to the stem wires may be accomplished quickly, conveniently and uniformly and the cost of this operation in manufacturing the lamps materially reduced.

In practicing my invention I employ devices for positioning the filament ends and stem wires in juxtaposition where the cement will serve to bind the parts together, and I thus reduce materially the time and expense of performing the operations incident to securing the filaments and wires together. I prefer also to provide means for holding the stems and filaments with the stem wires and filament ends in juxtaposition so that they will be accurately maintained in proper relation while the cement is being applied, in case the cement is applied after the parts are brought into juxtaposition, and during the setting of the cement. By employing this feature in connection with the devices which position the wires and filament ends in juxtaposition, the operations of positioning the stems and wires, and positioning the filaments, the applying of the cement, may be performed successively and the parts maintained in juxtaposition without the attention of the operator in case the parts are introduced into the positioning devices by hand manipulation.

In practicing the broader features of my invention the cooperating devices for positioning the stem wires and filament ends in juxtaposition may be arranged in fixed relation to each other or the wires and filament ends may be brought into juxtaposition by the relative movements of the parts carrying and supporting the stems and filaments. In either case the stems and the filaments may be placed in position either automatically or manually so far as the broader features of my invention are concerned.

For the purpose of illustration I have shown a simple embodiment of my invention which is especially designed for the manual placing of the stems and filaments in position and in which the devices for positioning the stem wires and filament ends in juxtaposition are in fixed relation to each other and act to guide and position the wires and filament ends as the stems and filaments are introduced into the apparatus or device by the operator, the device determining the position of the filament ends and stem wires so that they are in juxtaposition. I have also embodied in this simple form of my invention means for maintaining the stems and filaments in position so that they will remain in juxtaposition without the attention of the operator after they have been placed in position. This form of device or apparatus embodying my invention may be mounted and arranged in any convenient manner for facilitating the performing of the operations incident to securing the filaments and stem wires together and a series of such devices may be employed and mounted or arranged so that they may be moved successively from one operator to another in case it is desired to provide for the convenient and rapid performance of the different operations by different operators. In mounting this apparatus or device so that the successive operations may be quickly and conveniently performed by different operators, I have employed certain further features of invention which may be used with advantage, although they are not essential to the broader features of invention.

The various features of my invention will be understood from the following detailed description of one of the constructions in which I have embodied them and in which the devices for positioning the stem wires and filament ends in juxtaposition are maintained in fixed relation to each other, the stem wires and filament ends being brought into juxtaposition by the act of introducing the stems and filaments into the apparatus. The construction and mode of operation of this device or apparatus, as well as the construction and mode of operation of a somewhat modified form of the apparatus will be explained in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of a device or

apparatus for positioning the stem wires and filament ends in juxtaposition. Fig. 2 is an end elevation looking toward the left in Fig. 1 with the holding device for the filament closed. Fig. 3 is a similar view with the holding device for the filament open or in position for the introduction of the filament. Fig. 4 is a plan view of Fig. 1. Fig. 5 is a sectional view on line 5—5 Fig. 1, looking toward the left. Fig. 6 is a sectional view on line 6—6 looking toward the right, the stem being omitted. Fig. 7 is a view showing a stem and filament after the filament has been secured to the stem wires. Fig. 8 is a plan view of a machine in which the apparatus shown in the previous views may be embodied. Fig. 9 is an elevation of such machine. Fig. 10 is a detail showing the receptacle for containing the cement. Fig. 11 is a plan view of an apparatus or device for positioning the stem wires and filament ends in juxtaposition of a somewhat modified construction. Fig. 12 is a side elevation of the same. Fig. 13 is a sectional view on line 13—13 Fig. 12; and Fig. 14 is an end elevation of Fig. 12 looking toward the right with the retaining spring for the stem removed.

Referring to Figs. 1 to 6 the apparatus shown therein comprises a supporting plate B which is provided at one end with a vertically extending plate B' which is recessed to engage and support the stem A near its rear end. In front of the support B' is a plate B² provided with two recesses *b* in its upper edge. These recesses are provided with converging side surfaces and are open at their upper ends so that the stem wires *a* may be quickly and readily made to enter these recesses. The plate B² is comparatively thin so that when the stem A is in the position indicated in Figs. 1 to 4 the wires *a* will project beyond the plate. The plate B² is so arranged with relation to the plate B' that when the wires *a* rest in the bottom of the recesses *b* and the front end of the stem is against the plate B² the rear end of the stem will be supported by the plate B'. The recesses *b* are so located that their lower ends are the proper distance apart to bring the wires *a* into a definite position, the recesses being spaced apart substantially the distance between the wires *a*. When the stem A is placed in position it is maintained in position by means of a flat spring B³ secured to the rear side of the plate B' and projecting upward so that its upper end rests against the upper edge of the rear end of the stem as indicated in Fig. 1. When the stem is in position the pressure of the spring tends to press the stem forward thus holding the front end of the stem against the plate B² and also tends to rock the stem about the support B' thus holding the stem wires in position in the bottoms of the re-

cesses *b*. The supporting plate B also carries a block B⁴ the upper end of which is provided with two projecting ribs B⁵, the block being cut away between the inner rib B⁵ and the plate B² so that there is a free space below the wires *a* as they project through the recesses in the plate B². The ribs or plates B⁵ are provided with recesses *b'* having converging sides and open upper ends, the recesses being in substantial alignment with the recesses *b*. The sides of these recesses *b'* serve as guides for directing the ends of the carbon filament into position at the bottoms of the recesses so that the ends of the carbon filaments may be quickly and conveniently brought into position where they will be in juxtaposition to the stem wires *a* when the stem is in position in the apparatus. The surface of the block B⁴ between the plates or ribs B⁵ is substantially flush with the lower ends of the recesses *b'* and serves as a surface against which the carbon filament may be clamped to maintain the filament in position after it has been placed in position by the operator. Co-operating with this surface is a holding or clamping device consisting of a lever C pivoted to the block B⁴ and provided with a clamping member C' arranged to engage the surface C² between the plates B⁵. The clamping member may be provided with a cushioning surface of leather or felt C³ if found desirable. The clamping lever C is held in either open or closed position by a spring C⁴ which when the clamping lever is in the position indicated in Fig. 2, acts upon one side of the pivot of the lever to hold the clamping member against the surface C² and which acts upon the other side of the pivot when the clamping lever is in the position indicated in Fig. 3 to hold the clamping member away from the surface C² so that the carbon filament may be readily introduced into the recess *b'*. The lever C is provided with a projecting tail piece or handle C⁵ through which it may be moved to open or close the clamp. The plates B² and B⁵ are provided with central openings or recesses *b²* through which the anchor wire *a'* passes when the stem is in position.

In using this apparatus or device the stem A is introduced into the position shown in Fig. 1, the spring B³ yielding to allow the entrance of the stem and holding the stem efficiently in position after it has been introduced by the operator. As the stem is introduced the stem wires *a* pass readily into the recesses *b* and by the sides of these recesses are guided into proper position, the wires having been straightened by the operator in case they have become bent. The clamping lever C, having been opened in removing the previously cemented stem and filament, is in the position shown in Fig. 3,

and the filament F is quickly and readily introduced by passing the ends of the filament into the recesses b' , the sides of the recesses guiding the filament into position where the ends of the filament are in juxtaposition to the wires a . The clamping lever C is then closed and the ends of the filament and stem wires are thus positioned and maintained in juxtaposition. The loop of the filament F is introduced into the hook of the anchor wire a' either before, after, or in the act of introducing the filament ends into the recesses b' . The filament ends and wires are now in position where the cement may be readily and quickly applied and are maintained in this position until the cement has hardened, when the parts may be readily removed by opening the holding lever C and then withdrawing the stem. In case the same operator performs all the operations of introducing and cementing the parts, the operator may of course apply the cement before introducing the filament or before introducing the stem and in any case the order in which the stem and filament are introduced may be varied as found desirable.

In order to increase the rapidity with which the filaments and stem wires may be cemented together, I prefer to mount a series of devices such as described or of an equivalent construction so that they may be made to travel in succession through the same path and may thus be brought in succession to different operators, each operator performing a single operation. I prefer in carrying out this feature of my invention to mount the series of devices upon a rotary table, the devices being arranged in a circular series near the edge of the table and the table being so mounted that it may be turned intermittently to bring the positioning and holding devices in succession to the positions where the different operations are performed. The form of device which I have described may be mounted upon this table but I prefer to employ in this connection a modified form of holding device for holding the filament in position. An apparatus or device provided with the form of holding device which I prefer to use in this connection, is shown in Figs. 11 to 14. As shown in these views the holding device for maintaining the filament in position consists of two clamping members c^3 formed by bending laterally the ends of a wire spring, the wire being coiled at c^4 as indicated in Fig. 13. The ends of the wire extend from the holding portions c^3 in oppositely inclined directions at c^5 and act against inclined surfaces c^6 . By reason of the resiliency of the wires the action of the wires against the inclined surfaces tends to hold the clamping portions c^3 in the position indicated in full lines in Fig. 13. For the purpose of mov-

ing the clamping member c^3 into position for the introduction of the filament, as indicated in dotted lines in Fig. 13, a lever c^7 is provided, one end of which passes through the coil c^4 . This lever is pivoted at c^8 to a projection c^9 on the supporting plate B' and by depressing the rear end of the lever the spring wire may be moved upward to bring the clamping member c^3 into the dotted line position Fig. 13.

As shown in Figs. 8 and 9 I mount a series of the devices shown in Figs. 11 to 14 upon a table D which is mounted for rotation upon a standard D'. The table is loosely mounted between the flanges of two collars D² secured to the standard D' so that the table may be rotated by one of the operators as desired or the table may be rotated intermittently by automatic mechanism if desired. Pivoted to the upper collar D² is a lever D³ which projects radially of the table and is held in raised position against a stop D⁴ by a spring D⁵ connected to the lower flanged collar D² and to an operating rod D⁶ which is connected with the lever D³. The rod D⁶ is connected at its lower end to an operating treadle D⁷. By the rotation of the table D the levers C⁷ are brought successively in position beneath the front end of the lever D³ and when in this position the treadle D⁷ is depressed by the operator, thus depressing the lever D³ and depressing the rear end of the lever C⁷. This movement of the lever C⁷ throws the holding member C³ into the dotted line position Fig. 13, so that the operator may quickly introduce the carbon filaments into the recesses b' in the manner heretofore described. After the filament is thus introduced the treadle is released and the clamping members c^3 come into full line position (Fig. 13) to hold the filament in position. The movements of the table D also bring the devices for positioning and maintaining the parts successively into position in front of an operator who may introduce the stem. This may be done either before or after the filament has been introduced. After the filament and stem have been introduced, the movements of the table bring the parts into position in front of a receptacle E which contains cement and when in this position an operator may readily and quickly apply the cement to the overlapping ends of the wires and filament. After the cement has been applied continued movement of the table carries the parts beneath a drying device which consists of a pipe F arranged above the path of movement of the series of devices carried by the table, the pipe being provided with perforations or nozzles for applying heat to the cement and thus quickly hardening and drying the same. After the connected stems and filaments have passed the drying device they are removed by an operator who may

also introduce a new stem in position in the device from which the connected stem and filament is removed.

Without attempting to set forth in detail the various constructions and the various modifications which may be made in embodying my invention in concrete forms, what I claim and desire to secure by Letters Patent is:—

10 1. An apparatus for cementing the filaments of electric lamps to the stem wires which project from the stem, comprising a filament holding device for supporting the filament, and a stem holding device adapted to bring one of the stem wires into a definite and predetermined position when the stem is inserted in said holder to establish a pasting relation of the stem wire and filament.

20 2. An apparatus for cementing the filaments of electric lamps to the stem wires comprising a wire positioning device having a groove to receive the stem wire and hold it in definite position, and a filament positioning device having a groove cut to receive the filament and hold the end thereof in juxtaposition to the stem wire.

30 3. An apparatus for cementing the filaments of electric lamps to the stem wires, comprising devices for holding a stem and determining the position of a stem wire, and registering devices for determining the position of a filament end whereby the bringing of the filament end and stem wire into juxtaposition is insured.

25 4. An apparatus for cementing the filaments of electric lamps to the stem wires, comprising a support for the stem, a positioning device provided with a recess for engaging and positioning the stem wire, and a positioning device provided with a substantially aligning recess for engaging and positioning a filament end.

40 5. An apparatus for cementing the filaments of electric lamps to the stem wires, comprising a support for the stem, a device provided with a recess for receiving and positioning a stem wire, a device having a substantially aligning recess for receiving and positioning a filament end, and a filament holding device.

50 6. An apparatus for cementing the filaments of electric lamps to the stem wires, comprising a support for the stem, a plate provided with a recess having converging sides for positioning a stem wire, a plate having substantially aligning recesses with converging sides for positioning a filament end, a holding device for the same, and a holding device for the filament.

60 7. An apparatus for cementing the filaments of electric lamps to the stem wires, comprising a stem holding device, a wire positioning device provided with converging surfaces for positioning a stem wire and an aligning filament, positioning devices pro-

vided with converging surfaces for positioning a filament end, and devices for holding the filament.

8. An apparatus for cementing the filaments of electric lamps to the stem wires comprising a support for the stem, a positioning device provided with recesses for engaging and positioning the stem wires, and a positioning device provided with substantially aligning recesses for engaging and positioning the filament ends.

9. An apparatus for cementing the filaments of electric lamps to the stem wires comprising a support for the stem, a positioning device provided with recesses for engaging and positioning the stem wires and with a recess for the anchor wire, and a positioning device provided with substantially aligning recesses for engaging and positioning the filament ends and for the anchor wire.

10. An apparatus for cementing the filaments of electric lamps to the stem wires comprising a support for the stem, a device provided with recesses for receiving and positioning the stem wires, a device having substantially aligning recesses for receiving and positioning the filament ends, and a holding device for the filament.

11. An apparatus for cementing the filaments of electric lamps to the stem wires comprising a support for the stem, a plate provided with recesses having converging sides, a plate having substantially aligning recesses with converging sides, a holding device for the stem, and a holding device for the filament.

12. In an apparatus for cementing the filaments of electric lamps to the stem wires, the combination with a device for positioning a stem wire, of a filament holding device comprising a positioning guide for holding an end of the filament in juxtaposition with said stem wire, and a resilient clamping device for holding the end of the filament in said guide.

13. In an apparatus for cementing the filaments of electric lamps to the stem wires, the combination with a device for positioning a stem wire, of a filament-holding device comprising a positioning guide having a recess in alignment with the stem wire for receiving the end of the filament, and a resilient clamping member for pressing the end of the filament into said recess.

14. In an apparatus for cementing the filaments of electric lamps to the stem wires, the combination with a device for positioning a stem wire, of a filament-holding device comprising a positioning guide for holding an end of the filament in juxtaposition with said stem wire, a resilient clamping device for holding the end of the filament in said guide, and means for controlling said clamping device to grip and to release the filament.

15. In an apparatus for cementing the filaments of electric lamps to the stem wires, the combination with a device for positioning a stem wire, of a filament holding device comprising a positioning guide for holding an end of the filament in juxtaposition with said stem wire, a spring finger for clamping the end of the filament to said guide, and means for controlling said spring finger.

16. In an apparatus for cementing the filaments of electric lamps to the stem wires, the combination with a movable carrier, and a device mounted on said carrier for positioning a stem wire, of a filament-position-

ing guide mounted on said carrier to hold an end of the filament in juxtaposition with said stem wire, a resilient clamping member for holding the end of the filament in said guide, and a clamp actuator controlled by the operator and arranged to actuate said clamping member at a definite point in the movement of said carrier.

In witness whereof, I have hereunto set my hand, this 19th day of January 1906.

NORMAN MARSHALL.

In the presence of—

IRA L. FISH,

GEO. N. GODDARD.