

No. 869,317.

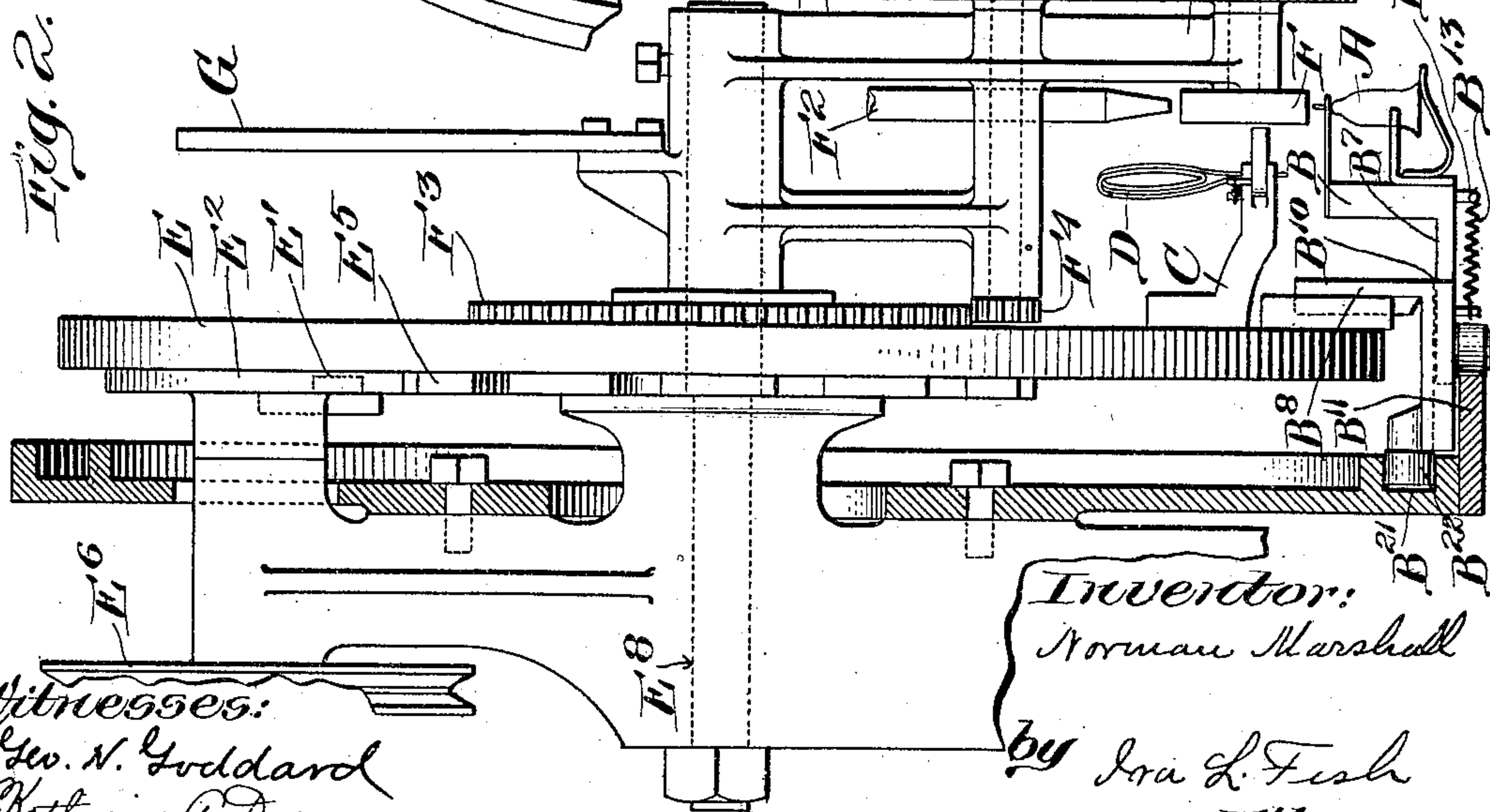
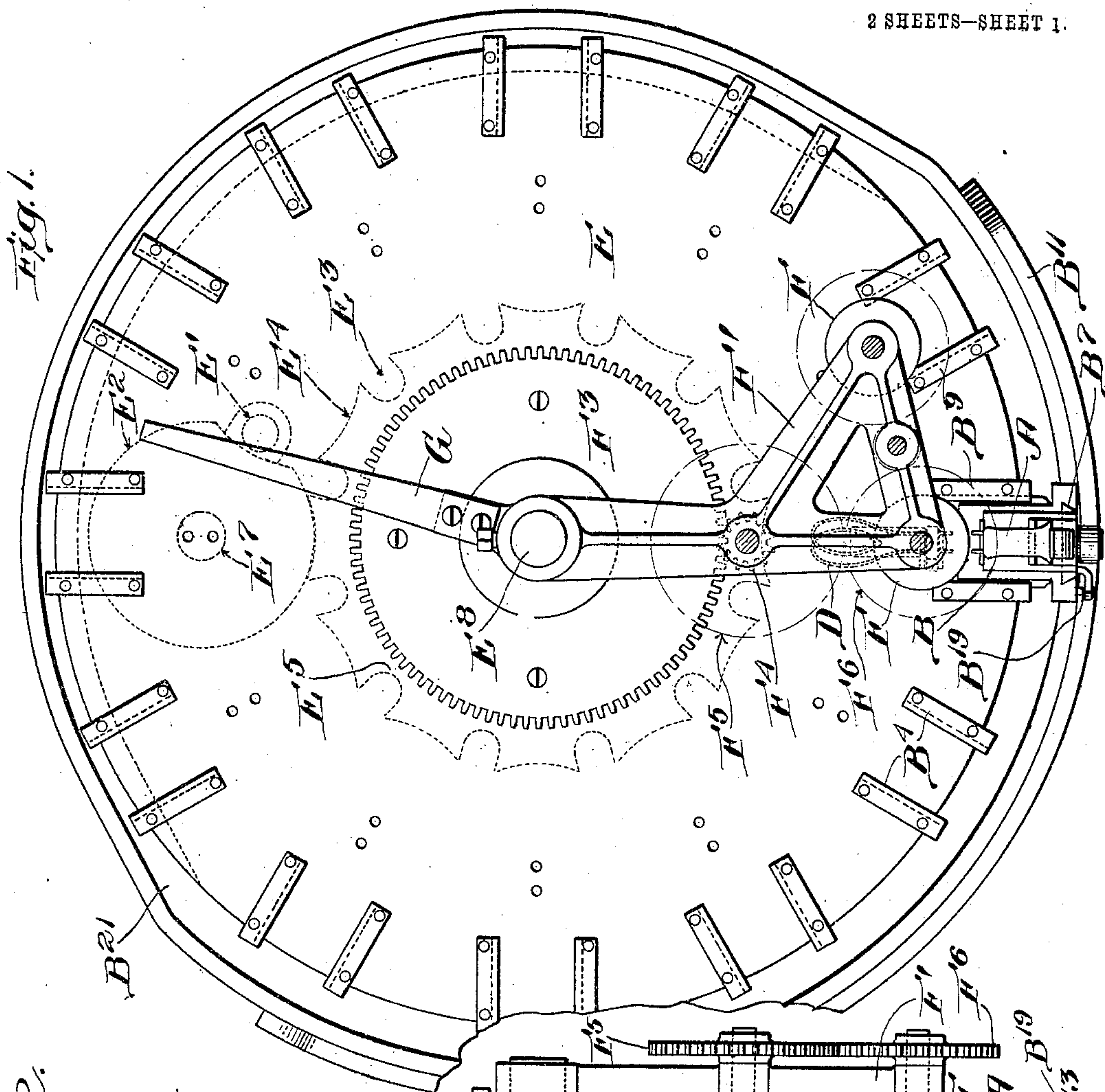
PATENTED OCT. 29, 1907.

N. MARSHALL.

APPARATUS FOR CEMENTING THE FILAMENTS OF ELECTRIC LAMPS
TO THE STEM WIRES.

APPLICATION FILED JAN. 27, 1906.

2 SHEETS—SHEET 1.



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Witnesses:

Geo. N. Goddard
Katherine A. Dugan

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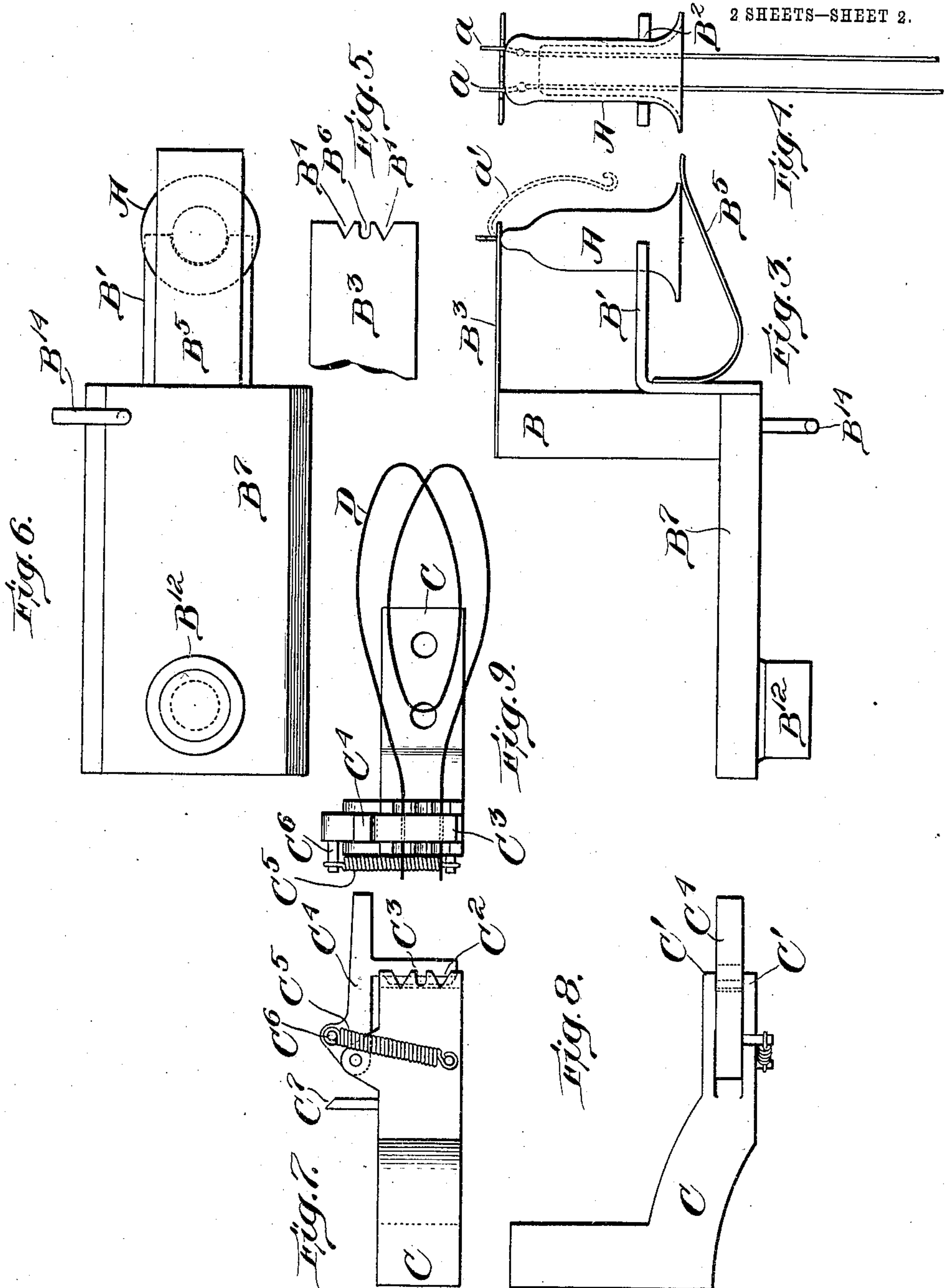
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UNITED STATES PATENT OFFICE.

NORMAN MARSHALL, OF NEWTON, MASSACHUSETTS.

APPARATUS FOR CEMENTING THE FILAMENTS OF ELECTRIC LAMPS TO THE STEM-WIRES.

No. 869,317.

Specification of Letters Patent.

Patented Oct. 29, 1907.

Application filed January 27, 1906. Serial No. 298,193.

To all whom it may concern:

Be it known that I, NORMAN MARSHALL, a citizen of the United States, and a resident of Newton, Massachusetts, county of Middlesex, have invented certain new and useful Improvements in Apparatus for Cementing the Filaments of Electric Lamps to the Stem-Wires, of which the following is a specification.

My invention relates to an apparatus or device for cementing the filaments of incandescent electric lamps to the stem wires and its object is to provide means whereby the securing of the filaments to the stem wires may be accomplished quickly, conveniently and uniformly with a resulting reduction in the cost of this operation in manufacturing lamps.

In practicing my invention the stem wires and filament ends are readily and uniformly brought into proper relation by the employment of devices for positioning the stem wires and cooperating devices for positioning the filaments, the devices being so supported or mounted that a relative movement between them may be effected in bringing the devices into such relation that the stem wires and filament ends will be in juxtaposition when introduced or when held in the positioning devices. The positioning devices may be of any suitable form and construction which will best meet the requirements of the conditions under which the machine in which the features of the invention are embodied is to operate. They may for instance be merely holding devices which hold the stems and filaments with the stem wires and filament ends in definite positions so that by relative movement of the holding devices the stem wires and filament ends may be brought together where the cement may be applied or where the wires and filament ends will be united by the cement previously applied to either the wires or filament ends, or the positioning devices may be devices which will act to guide or to bring the wires and filament ends into definite positions as the parts are introduced into the positioning devices, or the filament holding devices may operate to bring the filament ends into proper relative position after the filaments have been inserted. Either or both of the devices may be movable and either or both may be moved in effecting the relative movement between them. In case one of the positioning devices is fixed in position this device may serve merely as a device whereby the operator may quickly and conveniently place the filaments or stem wires as the case may be, in juxtaposition to the parts carried by the movable holding device when said holding device comes into proper position with relation to the fixed positioning device. I prefer however, in cases where a filament or stem is introduced manually, to provide means for retaining it in position as well as

means for guiding the filament end or wire into position.

The broader features of my invention may be embodied in machines in which the application of the cement to either the stem wires or ends of the carbon filaments, or to these parts after they are brought together, is performed manually but I prefer in embodying my invention in an efficient and rapidly operating apparatus to provide means for applying the cement.

In embodying the broader features of the invention in a machine or apparatus for rapidly cementing the filaments to the stem wires, I have employed certain features of invention which are of importance while they are not essential to the broader features.

The various features of the invention will be understood from the following detailed description of the machine which I have shown in the accompanying drawings for the purpose of illustrating one concrete embodiment of the various features of the invention.

In these drawings—Figure 1 is a front elevation of the apparatus; Fig. 2 is a side elevation; Fig. 3 is a detail side elevation of the stem holder; Fig. 4 is an end view of Fig. 3; Fig. 5 is a partial plan view of Fig. 3; Fig. 6 is a bottom view of Fig. 3; Fig. 7 is a bottom plan view of a filament holder; Fig. 8 is a side elevation; and Fig. 9 is a view looking toward the left of Fig. 7.

In the machine shown in the drawings the stem holding devices and the filament holding devices are especially designed for the manual introduction of the stems and filaments and these devices are so mounted that they at certain times move in unison and at other times a relative movement between the devices is effected which brings the filament ends and stem wires together where they are united by cement and subsequently causes a separation of the devices to the relative position where the filaments and stems are introduced and where the stem carrying devices cooperate with the cement applying devices to apply cement to the ends of the stem wires.

Referring in detail to the construction shown in the drawings the stem holding device comprises a support B provided with a laterally projecting plate or arms B' which is provided at its outer end with a semi-circular recess B² for engaging the rear part of the stem A. The support B also carries a laterally projecting plate B³ provided at its outer end with recesses B⁴ for receiving the stem wires a. The stem A is held in position in the supporting plate B' and with the front end of the stem in engagement with the plate B³ by means of a flat spring B⁵ which is arranged to engage the rear end of the stem and force it forward and inward toward the support B. The pressure of the spring therefore holds the stem firmly in the recess in the plate B' and at the same time tends to rock the stem about the plate B'

and thus maintain the stem wires *a* in the bottoms of the recesses *B*⁴. The recesses *B*⁴ are provided with converging sides so that the wires *a* may be readily introduced into these recesses and may be guided into the bottoms of the recesses which are the proper distance apart to properly position the stem wires *a*. This stem holding device is designed to carry a lamp stem having two projecting stem wires and is also adapted to support and carry such stems when provided with anchoring wires *a'* or may be employed for carrying stems which have no such anchoring wires. The plate *B*³ is provided with a recess *B*⁶ for the passage of the anchor wire in case the support is used for stems having such anchor wires.

The filament holding device shown in the accompanying drawings consists of a standard or support *C* provided at its outer end with two ribs or plates *C'* in which are formed recesses *C*² for receiving and positioning the ends of a carbon filament *D*. The recesses *C*² are provided with converging surfaces which guide the ends of the filaments into the bottoms of the recesses. The recesses *C*² are separated by a space substantially the same as the space between the recesses *B*⁴ and serve to maintain the ends of the carbon filaments substantially the same distance apart that the wires *a* are maintained by the recesses *B*⁴. The end of the support *C* between the plates *C'* serves as a surface against which the filament may be clamped by the clamping member *C*³ of a lever *C*⁴. The lever *C*⁴ is held in position to clamp the filament in position by means of a spring *C*⁵ connected to the standard *C* and to the lever so that when the lever is in clamping position the spring acts in front of the pivot of the lever *C*⁴ as indicated in Fig. 8. When the clamping lever is swung about its pivot to carry the clamping member *C*³ away from the surface between the plates *C'*, the pin *C*⁶ on the lever *C*⁴ to which the spring is connected is carried to the rear of the pivot of the lever so that the spring acts to hold the clamping lever in its open position against the stop *C*⁷. When the clamping lever is in this position the carbon filament may be readily introduced into the recesses *C*², the sides of the recesses acting to guide the ends of the filament into the bottoms of the recesses and thus into proper position. After the carbon has been introduced the clamping lever may be closed and will act to retain the carbon in position in the filament holder.

The filament holding device is secured in fixed position upon a rotary disk *E* as indicated in Fig. 2 and in dotted lines in Fig. 1. The stem holding device is also mounted upon the carrying disk *E* and the relative movement between the stem holder and the filament holder is effected by moving the stem holder as the carrier disk rotates. In order that the desired movements may be given to the stem holder, the support *B* for the stem holder is formed upon a slide *B*⁷ which extends at right angles to the support *B* and is mounted in guideways formed in a second slide *B*⁸, the second slide being mounted in guideways *B*⁹ secured to the disk *E*. The guideways *B*⁹ for the slide *B*⁸ extend radially of the disk *E* so that by moving the slide *B*⁸ toward and away from the center of the disk *E* the stem holder may be moved toward or away from the filament

holder which is secured upon the disk *E* between the slide *B*⁸ and the center of the disk. The ways *B*¹⁰ within which the slide *B*⁷ of the stem holding device is supported and guided, extend at right angles to the ways *B*⁹ upon the disk *E* so that by moving the slide *B*⁸ in the ways *B*¹⁰ the stem holding device may be moved toward or away from the face of the disk *E* and thus the wires *a* of the stem carried in the stem holding device may be moved into or out of line with the ends of the filament carried in the filament holding device. The movements of the slide *B*⁷ in the ways *B*¹⁰ are controlled by a stationary cam *B*¹¹ which is arranged in position to engage a roll *B*¹² mounted on the slide *B*⁷. The slide *B*⁷ is held normally in position with the support *B* against the slide *B*⁸ by a spring *B*¹³ having one end secured to a pin *B*¹⁴ projecting from the slide *B*⁷ and the other end secured to a pin *B*¹⁵ projecting from one of the ways *B*¹⁰ on the slide *B*⁸. When the slide *B*⁷ and support *B* are in position with the slide *B* against the slide *B*⁸ the recesses *B*⁴ in the stem holding device are in substantial alinement with the recesses *C*³ in the filament holding device and a radial inward movement of the slide *B*⁸ with the parts in this position will bring the wires *a* of a stem carried by the stem holder into juxtaposition with the ends of the filament *D* carried in the filament holder.

The radial movements of the slide *B*⁸ are effected during the rotation of the disk *E* by means of a fixed cam *B*²¹ provided with a cam groove which is engaged by a roll *B*²² on the slide *B*⁸. The cam *B*²¹ is properly shaped to move the slide *B*⁸ radially inward at the proper time to bring the stem wires and filament ends into juxtaposition and to move the slide radially outward at the proper time to carry the stem holder away from the filament holder.

The lateral movements of the stem holder which are effected by the cam *B*¹¹ are for the purpose of bringing the stem holder into position to cooperate with the cement applying device and to thereafter return the stem holder into position in line with the filament holding device.

In the construction shown the cement applying device consists of two rolls *F* mounted in a stationary bracket *F'* and arranged in position where the stem wires *a* will travel close to the surface of the rolls during the movements imparted to the stem holder by the rotation of the disk *E*. Cement is supplied to the surface of the rolls *F* through pipes *F*² in the proper quantities to keep the required supply of cement upon the surfaces of the rolls.

In order that the cementing of the filaments to the stem wires may be effected rapidly, the disk *E* carries a series of filament holding devices and also a corresponding series of stem holding devices, the stem holding devices and filament holding devices being successively brought into the positions where the stems and filaments are introduced therein and the stem holding devices being brought in succession in position to cooperate with the cement applying rolls and then into position to bring the stem wires into juxtaposition with the filament ends.

The disk *E* is intermittently rotated by means of a crank roll *E'* carried by a disk *E*², the crank roll and

disk cooperating with a series of radial slots E³ and a series of locking segments E⁴ formed in a disk E⁵ which is secured to the rear face of the disk E. The crank disk E² is continuously rotated through a pulley E⁶ 5 which is secured to the shaft E⁷ upon which the crank disk E² is secured. The disk E is loosely mounted upon a stud E⁸. By the rotation of the shaft E⁷ the disk E is intermittently rotated, the disk being advanced during each rotation of the shaft E⁷ through a 10 distance equal to the distance between the successive filament carrying and stem carrying devices.

The cement applying rolls F are rotated during the movement of the stem holders at a surface speed substantially equal to the speed of movement of the stem 15 holders so that the stem wires tip into the cement upon the rolls and are withdrawn without any substantial lateral movement of the wires in the cement. By this action the wires take up small globules of cement from the first roll which are increased in size by the introduction of the wires into the cement of the second roll. 20 The cement rolls F are rotated during the rotation of the disk E by means of gearing connecting the disk E with the rolls. This gearing consists of a gear F³ secured to the disk E and engaging a pinion F⁴ secured to the end of a shaft which is mounted in the bracket 25 F⁷ and is provided at its outer end with a gear F⁵ meshing with gears F⁶ on the cement roll shafts.

During the operation of the machine the filaments are introduced into the filament holders and the stems 30 are introduced into the stem holders by operators as these holders come successively into convenient position for the introduction of the parts and subsequently the stem holder is moved to bring the stem wires into contact with the cement rolls and then to move the 35 stem holder to bring the stem wires and ends of the filaments together so that they are united by the cement applied to the stem wires. During the subsequent movement of the stem holders and filament holders, the clamping lever C⁴ of the filament holder is brought 40 against a fixed cam arm G which operates to open the clamp arm so that the filament is free to be removed with the stem and the filament holder is in condition for the ready insertion of a new filament by the operator.

45 While I have shown a construction of stem holder and a construction of filament holder designed for use in connection with stems and filaments such as shown in the drawings, in which there are two stem wires and a single filament provided with a spiral coil, it will be 50 understood that these forms of stem holders and filament holders are not essential and that other forms of stem holders and filament holders may be employed.

In using the construction shown for cementing filaments to the stem wires for lamps in which there is an 55 anchor wire for the coil of the filament, the anchor wire should be bent into position where it will not be brought against the cement rolls, as indicated in dotted lines at a' in Fig. 3.

60 It will also be understood that various changes and modifications may be made in the construction and arrangement of parts and in the forms of mechanisms employed and in the devices and constructions for giving

relative movements to the parts and in the construction and manner of mounting the parts for relative movement, without departing from my invention. 65

Without attempting to point out in detail the various constructions in which the features of invention may be embodied, what I claim and desire to secure by Letters Patent is:—

1. An apparatus for cementing the filaments of electric 70 lamps to the stem wires, comprising a stem holding device, a filament holding device, and means operating to cause a relative movement between the devices which brings a wire and filament end into juxtaposition.

2. An apparatus for cementing the filaments of electric 75 lamps to the stem wires comprising a stem holding device, a filament holding device, means for applying cement to the part carried by one of the holding devices, and means for causing a relative movement between the holding devices to bring a stem wire and filament end together. 80

3. An apparatus for cementing the filaments of electric lamps to the stem wires, comprising a stem holding device, a filament holding device, means for applying cement, and means for moving the stem holding device into position 85 for applying cement to a stem wire and into position to bring the stem wire and a filament end together.

4. An apparatus for cementing the filaments of electric lamps to the stem wires comprising a stem holding device, means for applying cement to a stem wire, and means 90 whereby the filament end and stem wire may be brought together.

5. An apparatus for cementing the filaments of electric lamps to the stem wires comprising a stem holding device, means for applying cement to a stem wire, a filament holding device and means for causing a relative movement of 95 the holding devices to bring the wire and filament end together.

6. An apparatus for cementing the filaments of electric lamps to the stem wires comprising devices for positioning a stem with the stem wires in definite relation, devices for positioning a filament with the ends in a corresponding 100 definite relation, and means for supporting said devices for relative movement.

7. An apparatus for cementing the filaments of electric lamps to the stem wires comprising, a series of stem holding devices, a series of filament holding devices, means for advancing each series of holding devices and means for causing a relative movement between corresponding holding devices in the two series to bring the filament ends 105 and stem wires together.

8. An apparatus for cementing the filaments of electric lamps to the stem wires comprising a series of stem holding devices, a series of filament holding devices, means for applying cement, means for bringing the holding devices of one series successively to the cement applying device, and means for causing a relative movement between corresponding holding devices in the two series to bring a filament end and stem wire together. 110

9. An apparatus for cementing the filaments of electric lamps to the stem wires comprising a series of stem holding devices, a series of filament holding devices, means for applying cement, means for bringing the stem holding devices in succession to the cement device, and then into position to bring the stem wires and filament ends of corresponding holding devices in the two series together. 115

10. An apparatus for cementing the filaments of electric lamps to the stem wires comprising a series of stem holding devices, a series of filament holding devices, means operating to bring holding devices of each series successively into position with the filament ends and stem 120 wires in juxtaposition.

11. An apparatus for cementing the filaments of electric lamps to the stem wires comprising devices for holding the stems and determining the positions of the stem wires, devices for correspondingly positioning the filament ends, 125 and means for supporting said devices for relative movement. 130 135

12. An apparatus for cementing the filaments of electric lamps to the stem wires comprising devices for holding the stems and determining the positions of the stem wires, devices for holding the filaments with the filament ends correspondingly positioned, and means for supporting said devices for relative movement.

13. An apparatus for cementing the filaments of electric lamps to the stem wires, comprising devices for positioning the stem wires, devices for engaging and positioning

the filament ends, and means operating to cause a relative movement of said supporting devices to bring the stem wires and filament ends into juxtaposition.

In witness whereof, I have hereunto set my hand, this 26th day of January 1906.

NORMAN MARSHALL.

In presence of—

IRA L. FISH,

KATHARINE A. DUGAN.