No. 833,196. PATENTED OCT. 16, 1906.

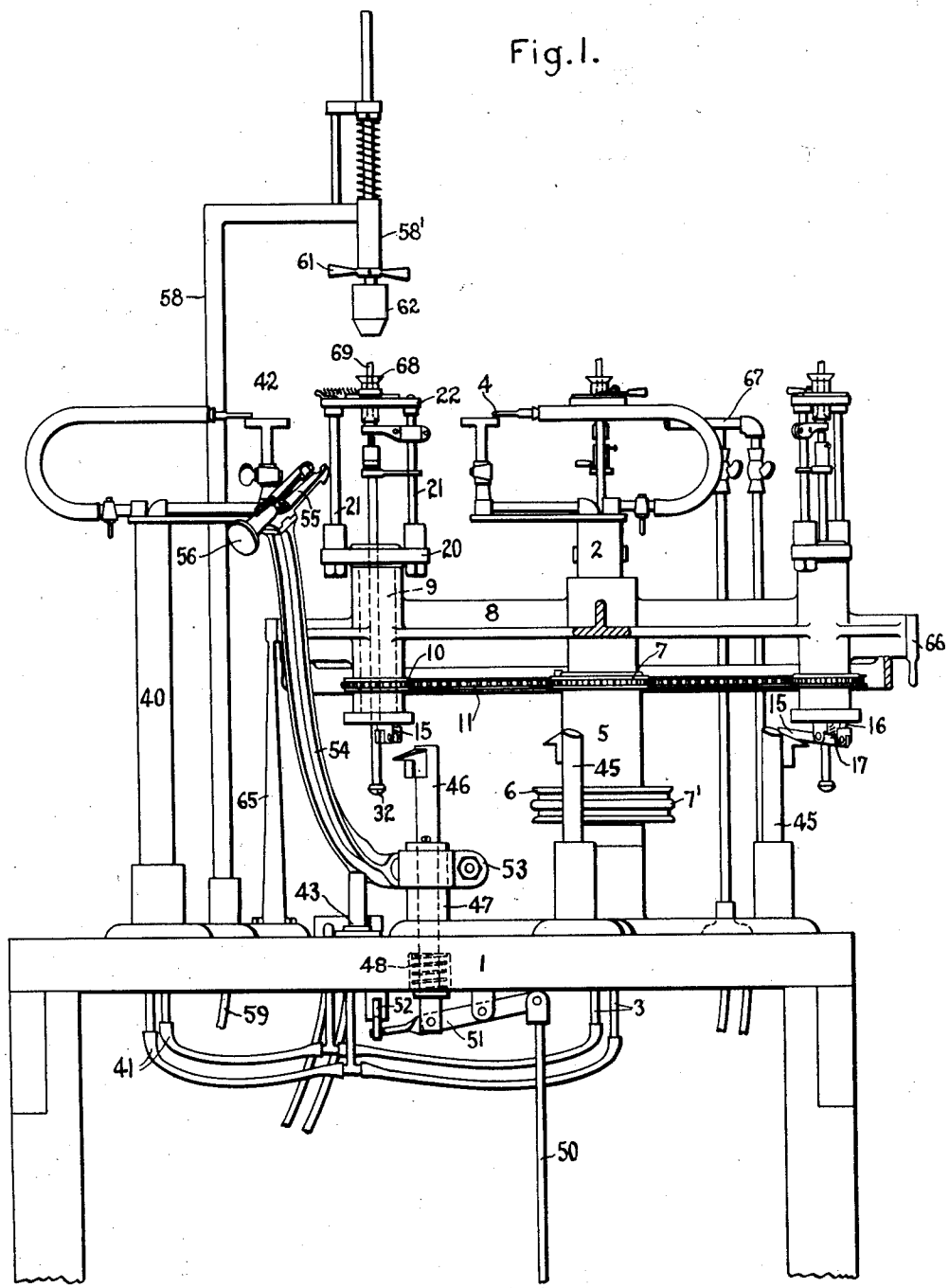
M. H. BRANIN.

STEM MAKING MACHINE.

APPLICATION FILED FEB. 3, 1906.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig.2.

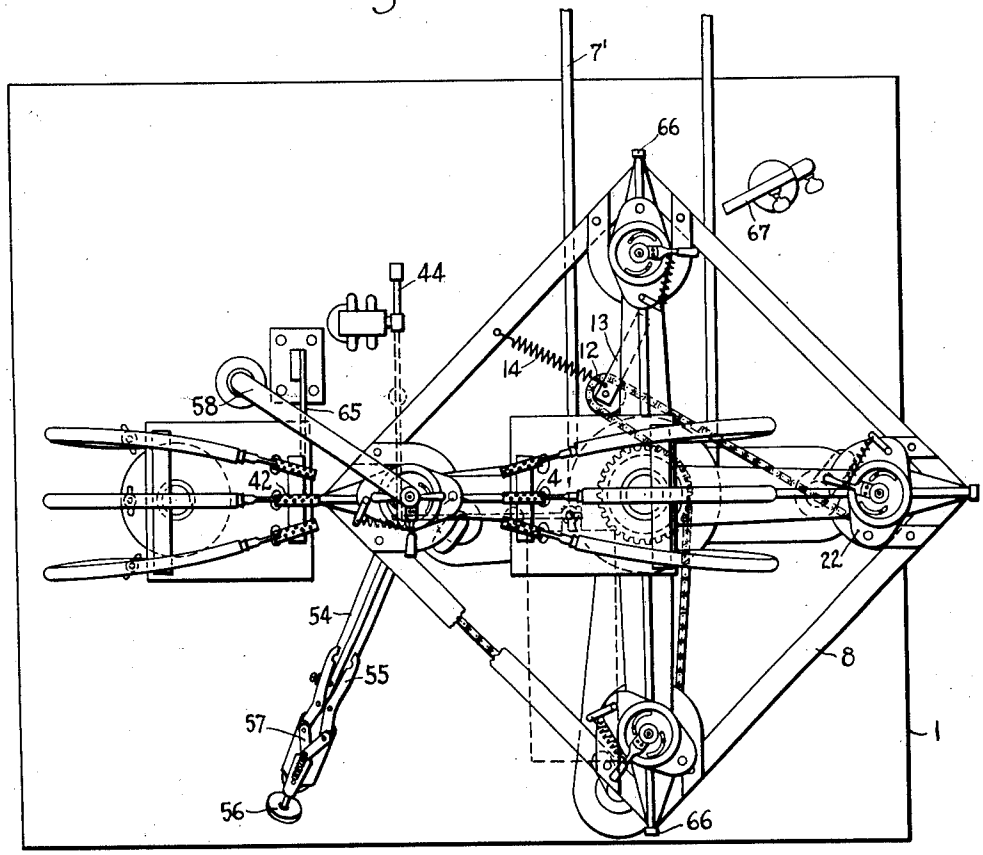
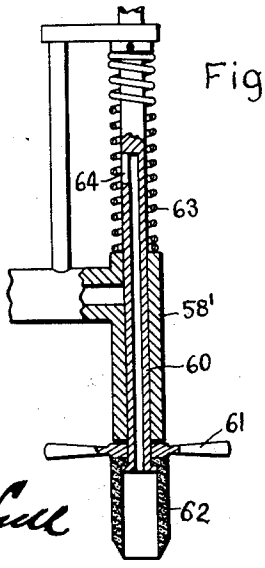


Fig.3.



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3 SHEETS—SHEET 3.

Fig. 4.

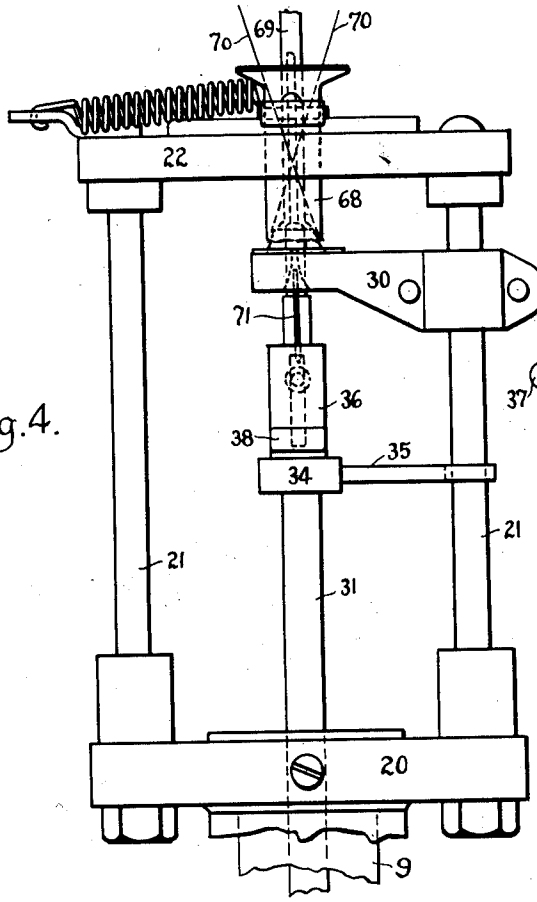


Fig. 6.

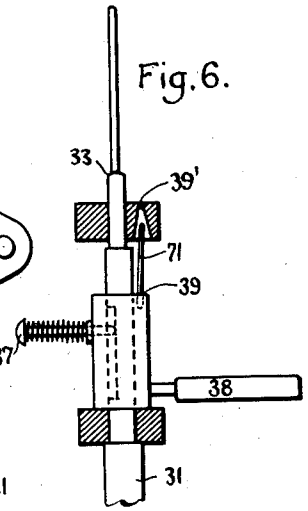
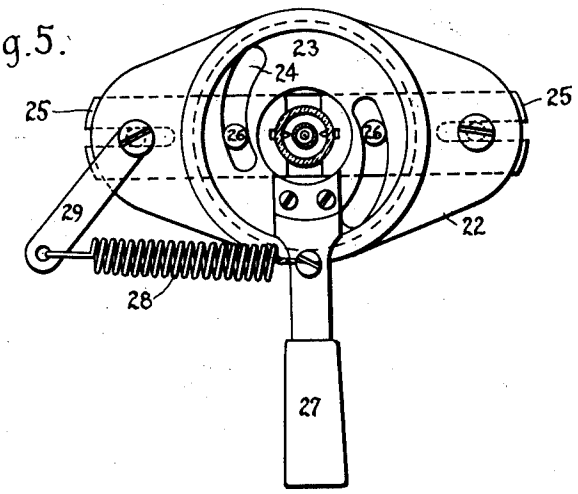


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

MARK H. BRANIN, OF NEWARK, NEW JERSEY, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

STEM-MAKING MACHINE.

No. 833,196. Specification of Letters Patent. Patented Oct. 16, 1906.

Application filed February 3, 1906. Serial No. 299,245.

To all whom it may concern:

Be it known that I, MARK H. BRANIN, a citizen of the United States, residing at Newark, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Stem-Making Machines, of which the following is a specification.

This invention relates to machines for making stems for incandescent lamps, and more particularly to machines for making double-tube stems for lamps which are exhausted through the stem rather than through a perforation in the end of the bulb opposite that in which the stem is sealed.

The object of the invention is to provide a machine capable of rapid operation for making double-tube stems which are uniform and of attractive appearance and in which the leading-in and anchor wires are firmly sealed.

The novel features of my invention will be definitely indicated in the claims appended hereto.

The details of the construction and the method of operation of my improved stem-making machine will be better understood by reference to the following description, taken in connection with the accompanying drawings, which show the preferred embodiment of my invention, and in which—

Figure 1 is a sectional elevation, and Fig. 2 a top view, of the machine. Fig. 3 is a sectional detail view of the air-coupling. Fig. 4 is an elevation of one of the rotary heads. Fig. 5 is a top view of the same, and Fig. 6 is a detail view of the support for the anchor-wire.

Referring to the drawings, 1 indicates a table on which is mounted a hollow standard 2, through which extend pipes 3, which supply gas and air to a plurality of blowpipe-burners 4, mounted on the upper end of standard 2. Loosely mounted on standard 2 is a sleeve 5, on which is formed a pulley 6 and a sprocket-wheel 7, and a belt 7′ runs on pulley 6 to communicate rotary motion to sleeve 5 from a suitable source of power. Above sleeve 5 and also loosely mounted on standard 2 is a frame 8, having a plurality of arms, each of which carries one of the rotary heads. In the present machine four of these heads are shown and all are of similar construction. In each arm of frame 8 is an opening in which a hollow shaft 9 is adapted to rotate. The lower end of shaft 9 is enlarged, and between this enlargement and frame 8 a sprocket-wheel 10 is loosely mounted on shaft 9. A chain 11 runs on the sprocket 10 of each of the rotary heads and on the sprocket 7 of sleeve 5, and also on an idler-sprocket 12, carried by a pivoted frame 13, which is retracted by spring 14 to hold chain 11 under tension. This chain communicates continuous rotary motion from the sprocket 7 to the sprocket 10 for each of the rotary heads. Pivoted on the enlargement at the lower end of each rotary head is a lever 15, one end of which is connected to a pin 16, extending through an opening in the enlarged end of shaft 9. A spring 17 connects lever 15 to the bottom of shaft 9 and is adapted to move pin 16 axially to carry its end into one of a plurality of openings in the side of sprocket 10 to connect the sprocket in driving relation to shaft 9 and the parts carried thereby. Secured to the upper end of shaft 9 is a cross-head 20, Fig. 4, from the ends of which rods 21 extend upward. Mounted on the upper ends of rods 21 is plate 22, having a circular opening therethrough, and a groove is formed in the wall of this opening. An annulus 23 is adapted to rotate in this groove, and in the annulus are two eccentric slots 24. Two clutch-plates 25 are adapted to move toward and away from each other in guideways formed in support 22, and on each of these clutch-plates is a stud 26, extending through one of the eccentric slots 24. Secured to the annulus 23 is a handle 27, and a spring 28 connects this handle to an arm 29 on support 22. Mounted on one of the rods 21 below support 22 is an arm 30, on the upper surface of which is formed a ridge on which the lower end of a tube held by the clutch-plates 25 is adapted to rest, and at the base of this ridge, on either side thereof, are rests for the ends of the leading-in wires, extending through the tube, so that the ends of these wires will extend beyond the end of the tube and will be held in definite relation—that is, one on either side of the ridge. In the arm 30 is an opening concentric with the annulus 23, and hence with a tube held by the clutch-plates 25. Extending through the hollow shaft 9 and movable therein, though held by friction when released, is a rod 31, having a knob 32 at its lower end and at its upper end extending through the opening in arm 30. Above arm 30 this rod is reduced in cross-section, so as

to form a shoulder 33, on which the lower end of the inner tube for a stem is adapted to rest. Secured on rod 31 is a collar 34, on which is an arm 35, which engages one of the rods 21, and thus prevents rotation of rod 31 independently of the head. Mounted for axial movement on rod 31 above the collar 34 is a sleeve 36, and a spring-pressed pin 37 extends through an opening in the sleeve and into a longitudinal groove in rod 31 to prevent rotation of the sleeve relatively to the rod. An operating-handle 38 is secured to sleeve 36, by which the sleeve may be raised and lowered on the rod. In the upper end of sleeve 36 is an opening 39, Fig. 6, to receive and support the end of an anchor-wire, and directly above this opening is an opening 39′ through the arm 30 adjacent to that through which rod 31 extends.

Mounted on table 1 is a second hollow standard 40, through which extend pipes 41, carrying air and gas to a plurality of blow-pipe-burners 42, mounted on the standard in horizontal alinement with burner 4. The pipes 41 and 3 are joined together and extend through a valve 43, the movable member of which is provided with a crank 44. In order to arrest rotation of the rotary heads in definite positions of frame 8, stops 45 are mounted upon base 1, on the upper ends of which are cam-surfaces adapted to engage the levers 15 and rock the same on their pivots, so as to withdraw the pins 16 from the openings in sprockets 10. When a head is between the burners 4 and 42, it is desired to permit rotation while the glass is being softened and then arrest rotation while effecting the seal, and for this purpose a stop 46 is provided which is vertically movable in a guide 47. This stop is depressed by a spring 48, and a pedal 49 is connected to the stop by a link 50 and lever 51, so that the stop may be raised by the operator against the tension of spring 48. Lever 51 is also connected by a link 52 to the crank 44 for operating the movable member of valve 43, so that the rotation of the head between the burners is arrested and the flames from burners 4 and 42 cut down simultaneously. Secured on the guide 47 is a support 53, to which is pivoted an arm 54, carrying at its upper end a pair of pivoted pincer-arms 55, adapted to be operated by a button 56, connected to the pincer-arms by toggle-links 57.

Secured on table 1 is a pipe 58, connected at its lower end by a pipe 59 with a source of supply of compressed air. Mounted for vertical movement in the opening in a section 58′ of the pipe, at the end thereof, as shown in Fig. 3, is a pipe 60, to the lower end of which is secured a handle 61 and a mouthpiece 62, of rubber or other suitable material. Pipe 60 is normally held in the raised position shown in Fig. 3 by a spring 63, and when drawn down against the tension of this spring an opening 64 comes into alinement with the end of pipe 58, so as to open a connection for the compressed air from pipe 58 through pipe 60 to the mouthpiece 62. These parts are so arranged that the mouthpiece 62 is in axial alinement with the tube held by the clutch-plates 25 when frame 8 is rotated to bring the tube between burners 4 and 42.

Mounted on table 1 is a spring-arm 65, adapted to coöperate with strips 66 on the frame 8 to arrest the movement of the frame in the operating positions. Mounted on table 1 to coöperate with each rotary head in the position of the frame next before the head is carried between the burners 4 and 42 is a preliminary heater 67.

The operation of the machine as thus constructed will now be described. When frame 8 is turned through ninety degrees to move one of the heads from between the burners 4 and 42 to the next position, the stop 45 engages the lever 15 and arrests the rotation of the head. The operator then turns handle 27 to move clutch-plates 25 away from each other and inserts a tube 68 between the clutch-plates, the lower end of the tube resting upon the ridge on the upper side of arm 30. Handle 27 being released is moved by spring 28 to cause clutch-plates 25 to grasp the tube and hold it in this position. An inner tube 69 is then moved down within the outer tube 68 until the flare at its end rests upon the shoulder 33 formed in rod 31. Rod 31 is then adjusted axially by knob 32 to bring the inner and outer tubes to the proper relation for sealing. Two leading-in wires 70 are then inserted between the two tubes, their ends extending down through the outer tube and resting upon the surfaces at the base of the ledge on which the end of the outer tube rests. Also the end of an anchor-wire 71 is inserted in the opening in the end of collar 36 with its upper end extending into or lying directly under the opening 39 in arm 30. The parts being assembled thus, the operator turns frame 8 ninety degrees, in which position it is arrested by spring-arm 65, and proceeds to assemble the lamp parts upon the next head which is then in front of her. This being done, frame 8 is again rotated through ninety degrees, and the lamp parts which were first assembled are thus carried into and rotated in the flame from the preliminary heater 67 and the glass is heated somewhat, so that it will be softened more quickly when moved into the flames from burners 4 and 42. While this is taking place the operator is assembling parts upon the head which is in front of her, and frame 8 is then rotated ninety degrees again. This brings the lamp parts which were first assembled between the burners 4 and 42, which converge upon the lower end of the outer tube 68 and rapidly soften the glass, thus causing the glass to fall in upon the flare at the lower end of the inner

tube 69 and become joined thereto. The head carrying these parts is rotating while in this position, since stop 46 is held in the retracted position by spring 48. When the glass is properly softened and the lower ends of the two tubes sealed together, the operator presses pedal 49, thus cutting down the flames from burners 4 and 42 and simultaneously therewith raising stop 46 and arresting the rotation of the head. Collar 36 is then raised upon rod 31 by means of handle 38, thus carrying the end of the anchor-wire 71 through the opening 39 and forcing its upper end into the soft glass of the tubes 68 and 69. Also the operator swings arm 54 on its pivot so as to carry the pincer-arms 55 into position for sealing and then presses the button 56, which actuates the pincer-arms. The cooperating faces of the pincer-arms are so formed that small ears of glass are pinched up around the leading-in wires on opposite sides of the stem without pressing together the glass walls between these ears. Closure of the opening through the inner tube 69 is prevented by the upper end of rod 31 extending therethrough. When the seal is effected in this manner the operator grasps handle 61 and draws the tube 60 down until the mouthpiece 62 enters the flare at the upper end of the outer tube 68. When the mouthpiece is in this position, the opening 64 is in alinement with the opening in pipe 58, so that compressed air is admitted from pipe 55 through opening 64, pipe 60, and mouthpiece 62 to the space between the inner and outer tubes 68 and 69, and the increase of pressure in this space forces the soft glass walls adjacent to the seal outward, so as to give the stem a finished and rounded appearance. When this has been accomplished, the operator releases handle 61, so that spring 63 can retract the mouthpiece 62 and then turns frame 8 through ninety degrees, as before, at the same time releasing pedal 49, so that the flames from burners 4 and 42 will play upon the lamp parts carried by the next head. This brings the finished stem around in front of the operator, in which position the rotation of the head carrying it is arrested by the stop 45 and the operator removes the completed stem and proceeds to effect the sealing of the stem, which is then between the blowpipe-burners.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A stem-making machine having a holder for the tube, means for supporting the leading-in wires with their ends projecting beyond the end of the tube, a rod movable axially toward and away from said holder and formed at its end to support an inner tube within the tube in said holder, and a member movable axially on said rod, and arranged to support an anchor-wire.

2. A stem-making machine having a holder for a tube, a support below the holder for the ends of the leading-in wires extending through the tube, said support having an opening therethrough, and an axially-adjustable rod extending through the opening in said support and formed at its end to support an inner tube within the tube in said holder.

3. A stem-making machine having a holder for a tube, a support below the same for the ends of the leading-in wires extending through the tube, said support having an opening therethrough, an axially-adjustable rod extending through the opening in said support and formed at its end to support an inner tube within the tube in said holder, and a member movable on said rod arranged to support an anchor-wire.

4. A stem-making machine having a holder for a tube, a support below the same for the ends of the leading-in wires extending through the tube, said support having an opening therethrough in axial alinement with the tube and a second opening offset therefrom, an axially-adjustable rod extending through the first-named opening in said support and formed at its end to support an inner tube within the tube in said holder, and a member movable on said rod arranged to support an anchor-wire in alinement with the second-named opening in said support.

5. A stem-making machine having means for supporting a tube and a pair of leading-in wires, the ends of said wires extending beyond the end of the tube and in definite relative positions, a heater for softening the glass at one end of the tube, and means for admitting compressed air to the other end of the tube.

6. A stem-making machine having a holder for a glass tube, supports for the ends of the leading-in wires extending beyond the end of the tube and in definite relative positions, burners for softening the glass at one end of the tube, pincers for squeezing the glass to form a seal, and means for admitting compressed air to the other end of the tube.

7. A stem-making machine having means for supporting an outer tube, an inner tube within the outer tube and leading-in wires between the two tubes, a heater arranged for softening the glass at one end of the outer tube, and means for admitting air under pressure to the other end of said tube.

8. A stem-making machine having means for supporting an outer tube, an inner tube within the outer tube and leading-in wires between the two tubes with their ends extending beyond the ends of the tubes, a heater for softening the glass at one end of the outer tube, a pinching device for effecting the seal at said end, and means for admitting compressed air to the other end of the tube.

9 A stem-making machine having means

for supporting an outer tube, an inner tube within the outer tube and leading-in wires between the two tubes, a heater arranged for softening the glass at one end of the outer tube, a coupling movable toward and away from the other end of said tube, and means actuated by movement of the coupling toward the tube for opening an air connection to the coupling.

10. A machine for making incandescent lamps having a standard, a frame rotatable thereon, a plurality of rotary heads carried by said frame driving mechanism therefor, supports for lamp parts carried by each of said heads, heaters for softening the glass parts on each head when brought to a definite position by the rotation of said frame, and means for simultaneously arresting the rotation of a head and cutting down the flames from said burners.

In witness whereof I have hereunto set my hand this 1st day of February, 1906.

MARK H. BRANIN.

Witnesses:

S. N. WHITEHEAD,

H. L. DITMARS.