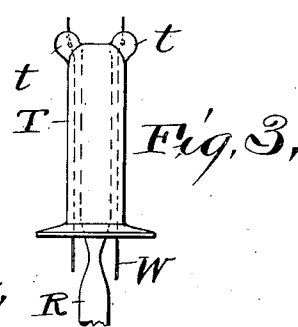
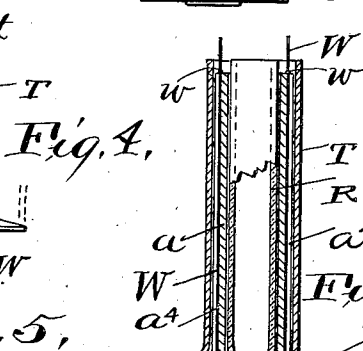
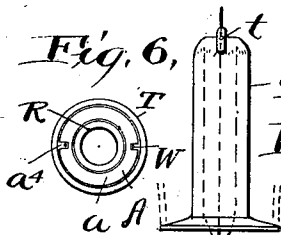
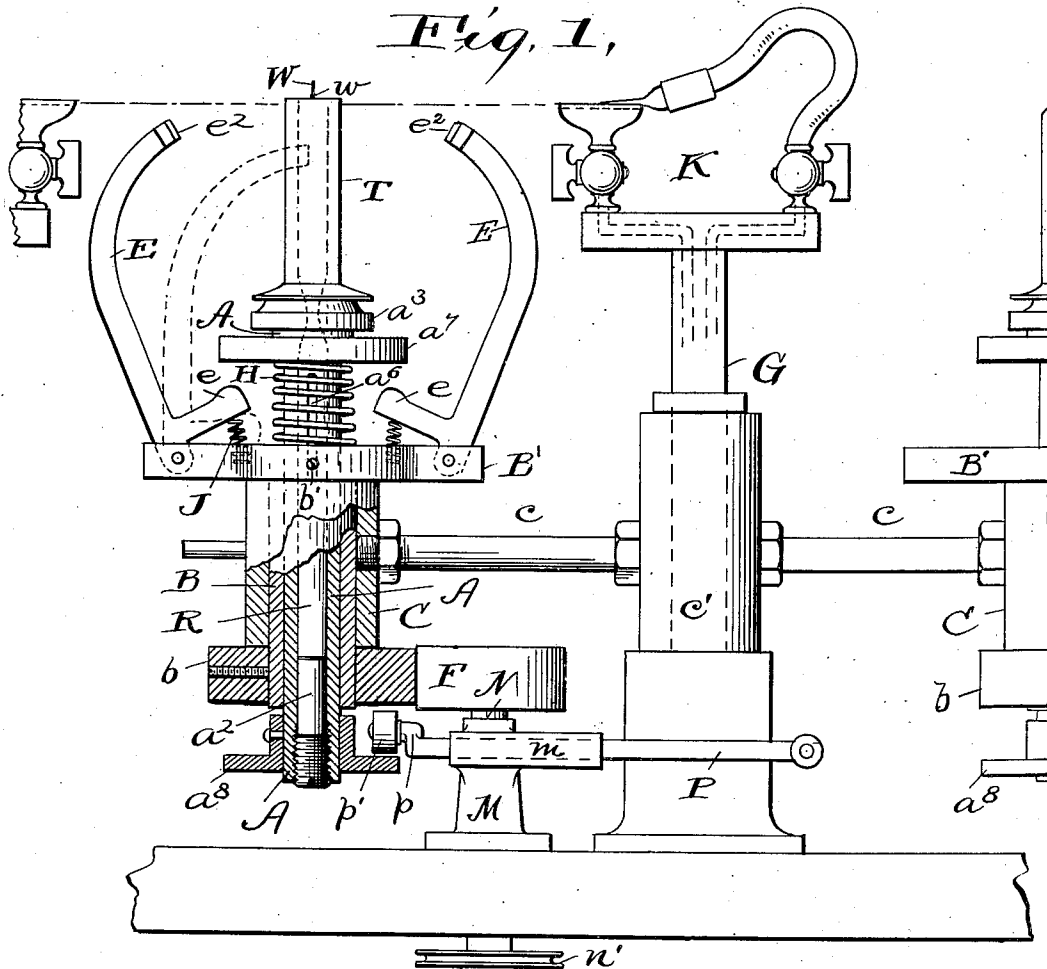


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CENTER TUBE STEM MACHINE.

APPLICATION FILED DEC. 22, 1902. RENEWED JULY 20, 1906.

936,153.

Patented Oct. 5, 1909.



Witnesses.
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UNITED STATES PATENT OFFICE.

WILLARD N. PACKER, OF SHELBY, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

CENTER-TUBE STEM-MACHINE.

936,153.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLARD N. PACKER, a citizen of the United States, residing at Shelby, in the county of Richland and State of Ohio, have invented a certain new and useful Improvement in Center-Tube Stem-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

In most incandescent lamps, platinum tipped wires pass through the closed inner end of a glass mount tube which is in the neck of the lamp, and has a flange on its outer end, which is sealed to the end of the lamp neck. In certain types of lamps, known as "tipless" lamps, the glass exhaustion tube is placed centrally within the flanged glass tube or so-called "flare", and the inner ends of the two glass tubes are sealed together without closing the inner end of the exhaustion tube. In the lamps referred to, the platinum tipped lead wires lie between these two tubes and pass through the glass which joins their inner ends.

The present invention relates to mechanism for quickly joining the ends of these two tubes, and for pressing the glass closely around the lead wires which pass through it.

The invention may be here summarized as consisting of the construction and combination of parts hereinafter described and pointed out definitely in the claims.

In the drawings, Figure 1 is an elevation, partly in section, of a machine embodying my invention; Fig. 2 is a longitudinal sectional view of the upper ends of the parts of the device which hold the two glass tubes and lead wires in proper relationship,—the said tubes and wires being also shown; Figs. 3 and 4 are views of the glass structure which the machine is designed to complete; Fig. 5 is an end view of one of the clamping faces of one of the levers which pinch the glass around the lead wires; Fig. 6 is a top plan view of the tubular post forming the upper part of the mechanism shown in Fig. 2.

Referring to the parts by letters, A represents a vertical tubular support for the two glass tubes T and R which are to be united. For reasons which will be presently explained this support is made in two parts, of which the upper part *a* fits into a rabbeted recess in the upper end of the lower part which supports the exhaustion tube R. The hole *a'* in said support extends from the top

downward a distance slightly less than the length of the glass tube R, which is to be placed in this hole. In the construction shown the hole goes entirely through the support, but a plug *a''* screws into its lower end and is therefore adjustable so that the support is capable of use with glass tubes R of different lengths. The support is also provided with an external flange *a'''* on which the lower end of the flanged glass tube T may rest. This flanged tube is commonly known as a "flare" and is sometimes called a mount tube. In the construction shown this external flange is in the form of a nut which screws upon the support, wherefore it is adjustable up and down, and therefore capable of use with the flanged glass tubes T of various lengths. Means are also provided for holding the platinum tipped wires in place so that they will occupy a vertical position between the glass tubes upon the support, as stated, and so that said wires shall extend above the plane in which the glass tubes are to be welded together. The means shown for so supporting the wires are vertical grooves *a⁴* in the upper end of the support A, which grooves are placed at diametrically opposite points, and extend down as far as may be necessary to accommodate the wires. These external grooves in the construction shown are in the outer surface of the upper end *a* of the support, but the internal surface of the lower part of the support is also grooved in such way as to form the continuations of the grooves *a⁴*. The wires W are placed in these grooves in such wise that the little bur *w* formed by welding the platinum tips to the wires, shall rest upon the top of the support, and when they do so rest, the lower ends of the wires project into the grooves inside of the lower part of said support. When the glass tubes are supported by the means stated, so that their upper ends project slightly above the top of the support, and when the wires are also supported as stated, as shown clearly in Fig. 2, a blow pipe flame (or flames) is directed against the upper ends of said glass tubes above the support carrying the mount tube, and the support itself is rotated upon its vertical axis so that all sides of said glass tubes shall be equally heated and softened. When so softened the upper edge of the outer glass tube falls inward into contact with the inner

tube, whereupon said tubes weld themselves together, and in so doing embrace the two wires. Then, in order to insure a perfect weld and to form tight joints around said
 5 wires, certain glass pinching or mount forming devices are caused to force the upper edge of the outer tube inward against the edge of the inner tube, and also to grasp some of the soft glass and pinch it tightly around
 10 the wires, the glass so pinched taking the form of flat ears *t*, shown in Figs. 3 and 4. This is of course accomplished without pinching together the top of the inner or exhaust tube R. In the construction shown,
 15 the lower end of this support A is concentrically placed in a rotating member B, from which it extends at both ends. This rotating member is mounted in a vertical bearing sleeve C, and has secured to its
 20 lower end a friction wheel *b*, by means of which, through contact with the rotating friction wheel F, said member may be rotated. The support A is splined in the rotating member by means of the screw *b'* rigidly secured in the rotating member to project
 25 into a vertical slot *a*⁵ in the support whereby the support partakes of the rotary movement of the member B, but is capable of vertical movement therein. A spring H,
 30 which embraces the support between the top of the member B and a flange *a'* upon said support, exerts its force to hold the support in the elevated position shown in Fig. 1.

The glass pinching devices or mount forming means are in the form of bent levers E which are pivoted to the flange B' of the member B, on horizontal pivots, placed at diametrically opposite points. Each of these levers has an inwardly projecting arm *e*,
 35 with which a spring J engages to force it upward, and thereby throw the upper ends of said levers away from each other. These spring actuated arms, however, extend under the flange *a'* on the support. When the
 40 support is moved downward in the member B, this flange engaging with these arms, causes the levers to rock in such direction that their upper ends move toward each other, and into contact with the upper ends
 45 of the glass tubes being operated upon. On the proximate faces of the upper ends of each of these levers are two projecting lugs *e*². When these levers are swung toward each other, portions of the softened glass,
 50 on opposite sides of the vertical axis of the tube T, are caught between the lugs on one lever and the lugs on the other lever, and pinched together to form two ears *t*, which embrace the wires W. At the same time the
 55 parts of the lever ends between the lugs, engage with the softened upper end of the tube T and make it certain that these soft parts of the tube be pushed inward into contact with the upper end of the inner tube

R. The space between the lugs permits this
 65 pressing of the ends of the tubes to be accomplished without closing the top of the inner or exhaust tube.

The sleeve C in which the member B is rotatably mounted is secured to the outer
 70 end of an arm *c* whose inner end is secured to a hub *c'* which is rotatably mounted on a vertical standard G. Preferably another arm *c* extends from this hub in a diametrically opposite direction, and, upon this arm
 75 is supported mechanism precisely like that which has been explained. A blow pipe device K is supported upon the top of this standard G and is of such convenient construction and is so arranged that the flame
 80 is blown horizontally outward from the center across the path which must be traveled by the upper ends of the glass tubes, if the skeleton frame, of which the hub *c'* and arms *c c* are a part, is rotated upon said
 85 standard. In practice one of the devices carried by this skeleton frame is loaded,—that is to say, the glass tubes T R and wires W are placed thereon, when it is in position relative to the blow pipe flames, as shown
 90 at the right of Fig. 1. The frame is then swung around until the upper ends of the glass tubes are in the range of the blow pipe flames, where the frame is stopped long
 95 enough for the tubes to be softened for the welding operation. When the frame is in this position, the friction wheel *b* on the lower part of the member B, is in contact with a friction wheel F, secured to a vertical
 100 shaft N mounted in a fixed standard M wherefore the member B and the support A are rotated. The shaft N referred to may be constantly rotated by any suitable means, as for example, by a belt engaging with the pulley *n'* on its lower end. A rock shaft P
 105 is mounted in a bracket *m* forming a part of the standard, and on one end of this rock shaft is a crank arm *p* carrying a friction roller *p'* which extends over and into contact with an annular flange *a*⁸ on the lower
 110 end of the support A. When the upper ends of the glass tubes are sufficiently heated, this rock shaft P is turned in its bearings, and the support A is drawn downward in opposition to the spring H, thereby withdrawing
 115 the upper ends of the glass tubes from the range of the blow pipe flame. The flange *a'* on the support, engaging with the arms *e* of the pinching levers, causes such levers to be swung toward each other and to complete the operation of securing the two glass
 120 tubes together, as before explained. In the meantime, the device at the other side of the skeleton frame has been loaded. The skeleton frame is now swung upon its axis to
 125 bring this loaded device into operative position with respect to the other parts described, while the support carrying the fin-

ished product is moved around so that the operator may conveniently remove said product.

The upper end *a* of the support is so much in the blow pipe flame that it becomes worn out after a while. This part may be removed and another similar part substituted without any other change in the mechanism.

Having described my invention, I claim:

1. The combination of a vertical support having a central hole extending from the top downward a suitable distance, an external flange, and vertical wire grooves, with means for directing a blow pipe flame across the top of said support.

2. The combination of a vertical support having a central hole extending from the top downward a suitable distance, an external flange, and vertical wire grooves, with means for directing a blow pipe flame across the top of said support, and glass pinching devices for pinching together, around the wires, the softened ends of the glass tubes held upon said support.

3. The combination of a vertical tubular support, a plug screwed into its lower end, an external flange vertically adjustable upon said support, and means for directing a blow pipe flame across the top of said support.

4. The combination of a vertical rotatable member, and means for rotating the same, a support secured axially in said member, a connection between said support and member whereby both must rotate in unison but the latter may move axially in the former,—said support having a hole extending from its top downward a suitable distance and having an external flange, glass pinching devices mounted upon said rotatable member, and means for directing a blow pipe flame across the top of said support.

5. The combination of a vertical rotating member, means for rotating it, a support supported axially in said member and capable of moving endwise therein but compelled to rotate with said member,—said support having a hole extending from the top downward a suitable distance, an adjustable nut, and an external flange, a spring operating to move the support upward in the rotatable member, and two glass pinching levers pivoted to said member and having arms extending under the flange on the support, springs for moving said glass pinching levers apart, means for moving the support in opposition to its spring, and means for directing a blow pipe flame across the top of said support.

6. The combination of a vertical bearing sleeve, a member rotatably mounted therein and having on its lower end a driving wheel, a support passing axially through said rotatable member having a hole extending from the top downward a suitable distance and having an external vertically adjustable flange, mechanism compelling simultaneous

rotation of said member and support but permitting the latter to move vertically within the former, a spring operating to move said support upward, a flange on the lower end of the support, a rock shaft having a crank arm, a friction roller mounted on said crank arm engaging with said flange, glass pinching levers mounted upon said rotatable member and having inwardly extended arms, and a flange fixed to said support above said arms, substantially as specified.

7. The combination of a member rotatable upon a vertical axis, a support passing axially through said rotatable member,—there being a tongue and groove connection between said support and member, and said support having a hole extending from its top downward a suitable distance, and an external adjustable flange,—the upper end of said support being removably secured to the lower part thereof, with means for rotating said member, means for moving the support vertically therein, glass pinching levers mounted upon said member, and means for directing a blow pipe flame across the top of said support.

8. A machine for making the stems of incandescent lamps, comprising means for holding an outer tube, an inner tube and lead wires in proper relation to each other, and means for welding the ends of the tubes to one another and sealing in the lead wires at the welding point.

9. A machine for making the stems of incandescent lamps, comprising a support for an outer tube, means for supporting an inner tube and lead wires, means for heating the adjacent ends of the tubes, and means for forcing the softened ends of the tubes into contact with one another and pressing the glass around the lead wires.

10. A machine for making the stems of incandescent lamps, comprising an adjustable support for an outer tube, means for supporting an inner tube and lead wires, means for heating the adjacent ends of the tubes, and means for forcing the softened ends of the tubes into contact with one another and pressing the glass around the lead wires.

11. A machine for making the stems of incandescent lamps, comprising a support for an outer tube, means for adjustably supporting an inner tube and lead wires, means for heating the adjacent ends of the tubes, and means for forcing the softened ends of the tubes into contact with one another and pressing the glass around the lead wires.

12. A machine for making the stems of incandescent lamps, comprising an adjustable support for an outer tube, means for adjustably supporting an inner tube and lead wires, means for heating the adjacent ends of the tubes, and means for forcing the

softened ends of the tubes into contact with one another and pressing the glass around the lead wires.

13. A machine for making the stems of incandescent lamps, comprising means for holding an outer tube, an inner tube and lead wires in proper relation to each other, means for rotating the support upon which the tubes are held, means for heating the adjacent ends of the tubes, and means for forcing the heated ends of the tubes into contact with one another and pressing the glass around the lead wires.

14. A machine for making the stems of incandescent lamps, comprising means for holding an outer tube, an inner tube and lead wires in proper relation to each other, means for rotating the support upon which the tubes are held, means for heating the adjacent ends of the tubes, means for shifting the tubes and the heating device out of active relation, and means for forcing the softened ends of the tubes into contact with one another and pressing the glass around the lead wires.

15. A machine for making the stems of incandescent lamps, comprising a support for holding an outer tube, an inner tube and lead wires in proper relation to each other, means for rotating said support, a blow pipe for heating the adjacent ends of the tubes during rotation of the support upon which they are held, and means for lowering the support and thereby withdrawing the ends of the tubes from the range of the blow pipe and simultaneously forcing the softened ends of the tubes into contact with one another and pressing the glass around the lead wires.

16. A machine for making the stems of incandescent lamps, comprising a support for adjustably holding an outer tube, means for adjustably holding an inner tube, means for

retaining the lead wires in proper position between the outer and inner tubes, means for heating the adjacent ends of the tubes, and means for forcing the softened ends of the tubes into contact with one another and at the same time pressing the glass around the lead wires whereby the outer and inner tubes are sealed together but an opening is retained through the inner tube.

17. A machine for making the stems of incandescent lamps, comprising a support for holding an outer tube, an inner tube and lead wires in proper relation to each other, means for heating the adjacent ends of the tubes, two jaws each having two projecting lugs, and means for forcing the jaws against the softened ends of the tubes whereby the tubes are pressed into contact with one another and the glass pressed around the lead wires.

18. In an apparatus for forming incandescent lamp mounts, the combination of means for supporting the flare, and means for supporting the exhaustion tube within said flare.

19. A machine for forming incandescent lamp mounts comprising a heater, a rotatable support for the mount tube, and means rotatable with said support for forming the mount, substantially as described.

20. A machine for forming incandescent lamp mounts comprising a rotatable frame having rotatable apparatus thereon comprising a mount tube support, and means for forming the mount, substantially as described.

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

WILLARD N. PACKER.

Witnesses:

E. B. GILCHRIST,
M. S. METZENBAUM.